APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

5862260

FIG. 4

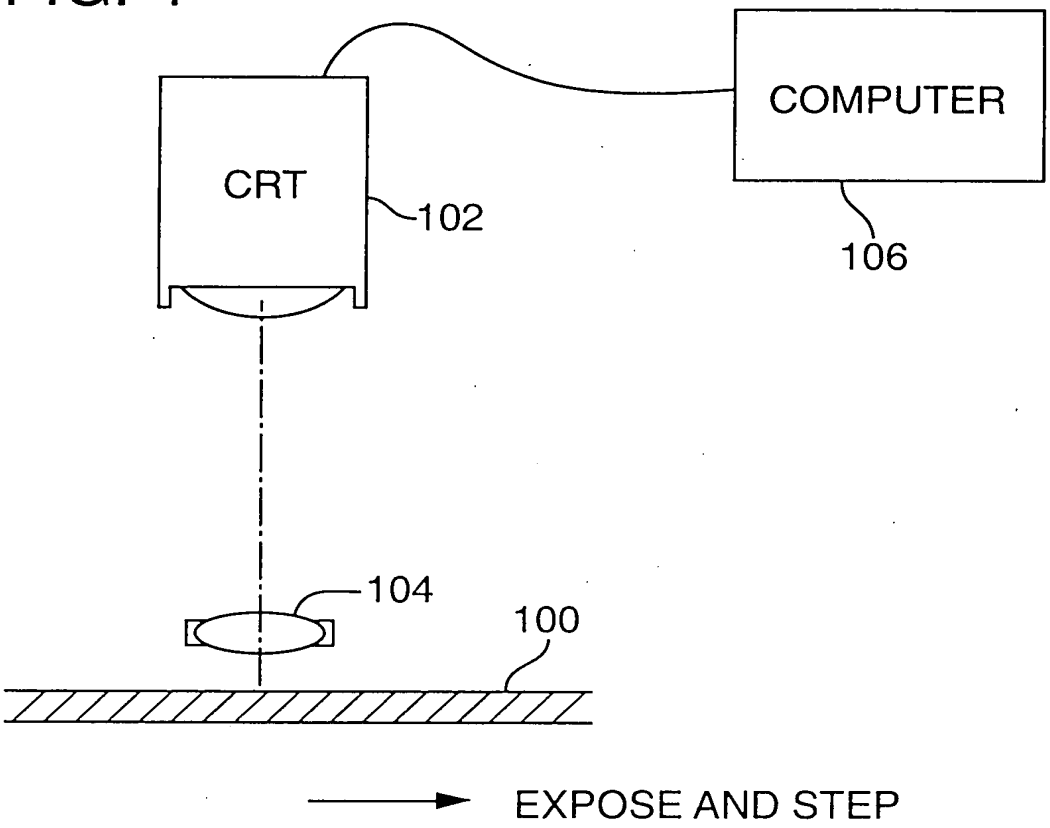
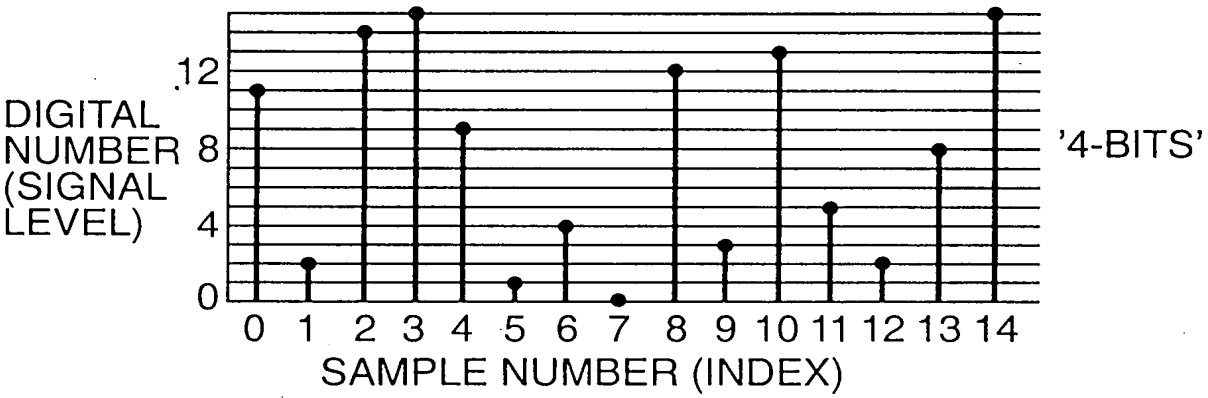
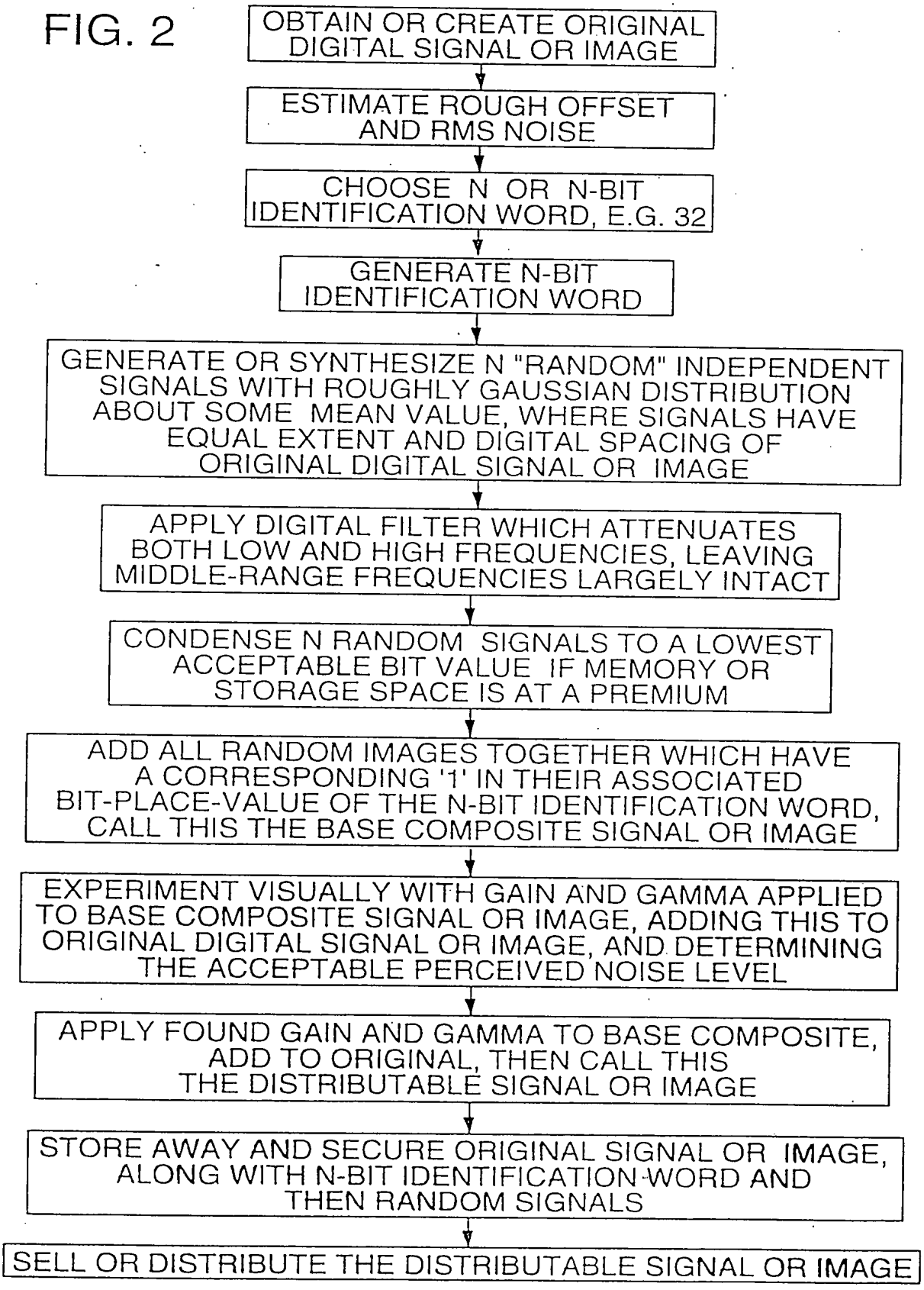


FIG. 1



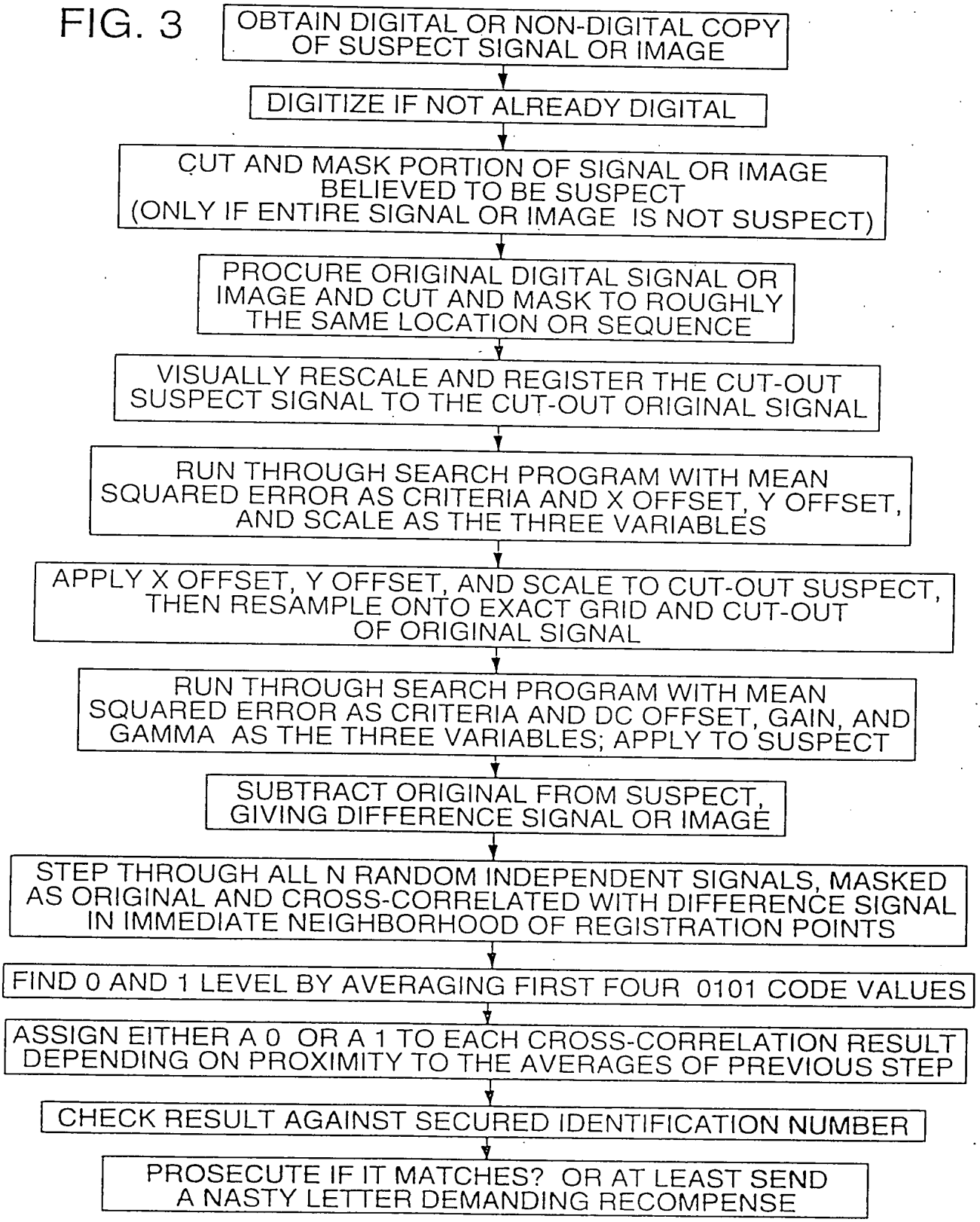
APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 2



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 3



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 5

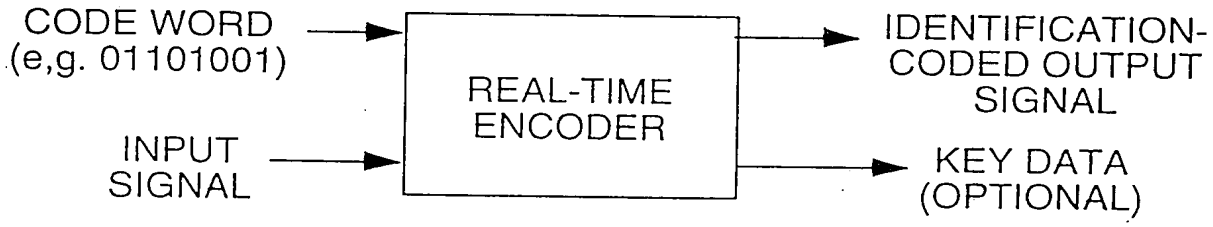
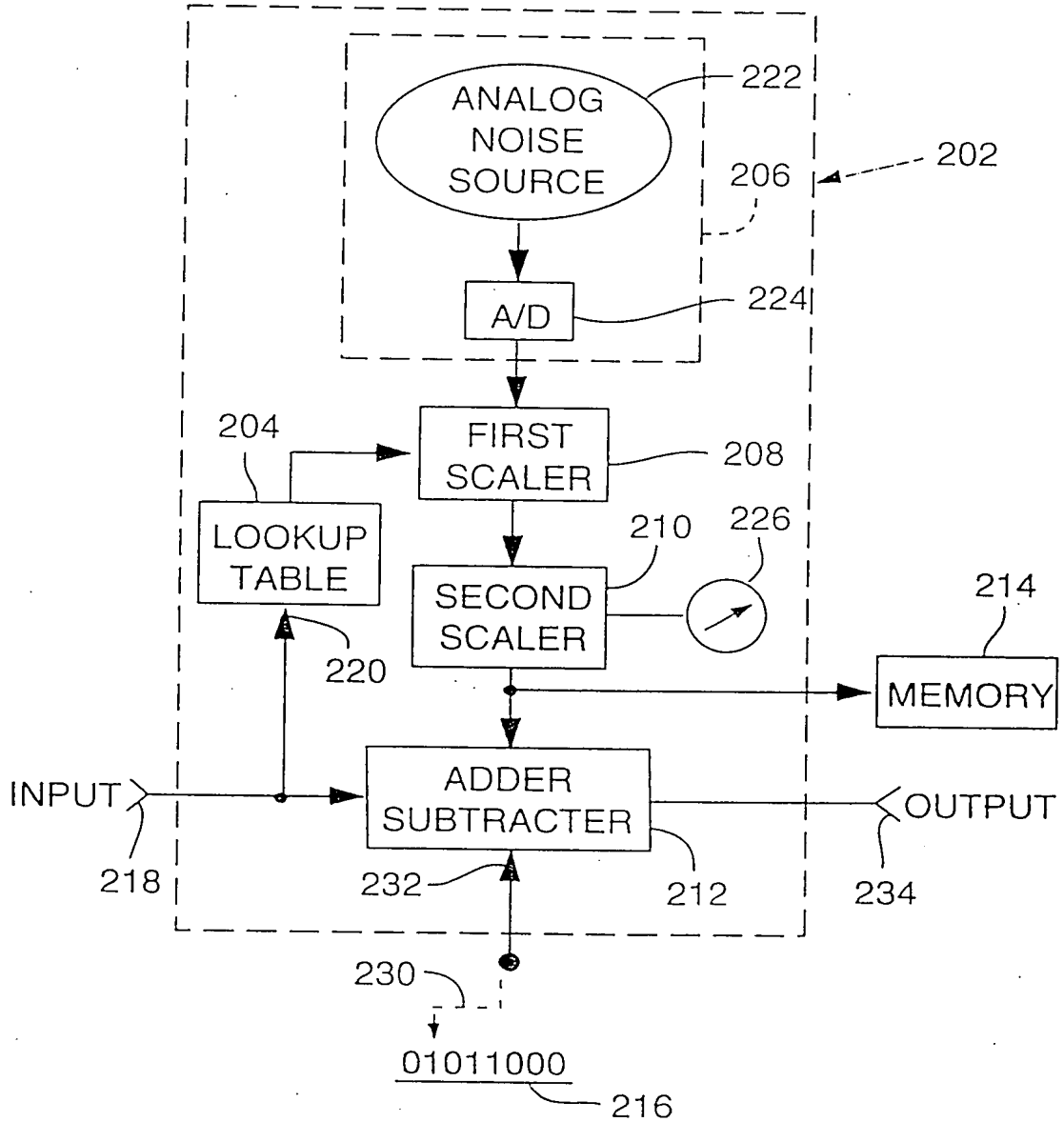


FIG. 6



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

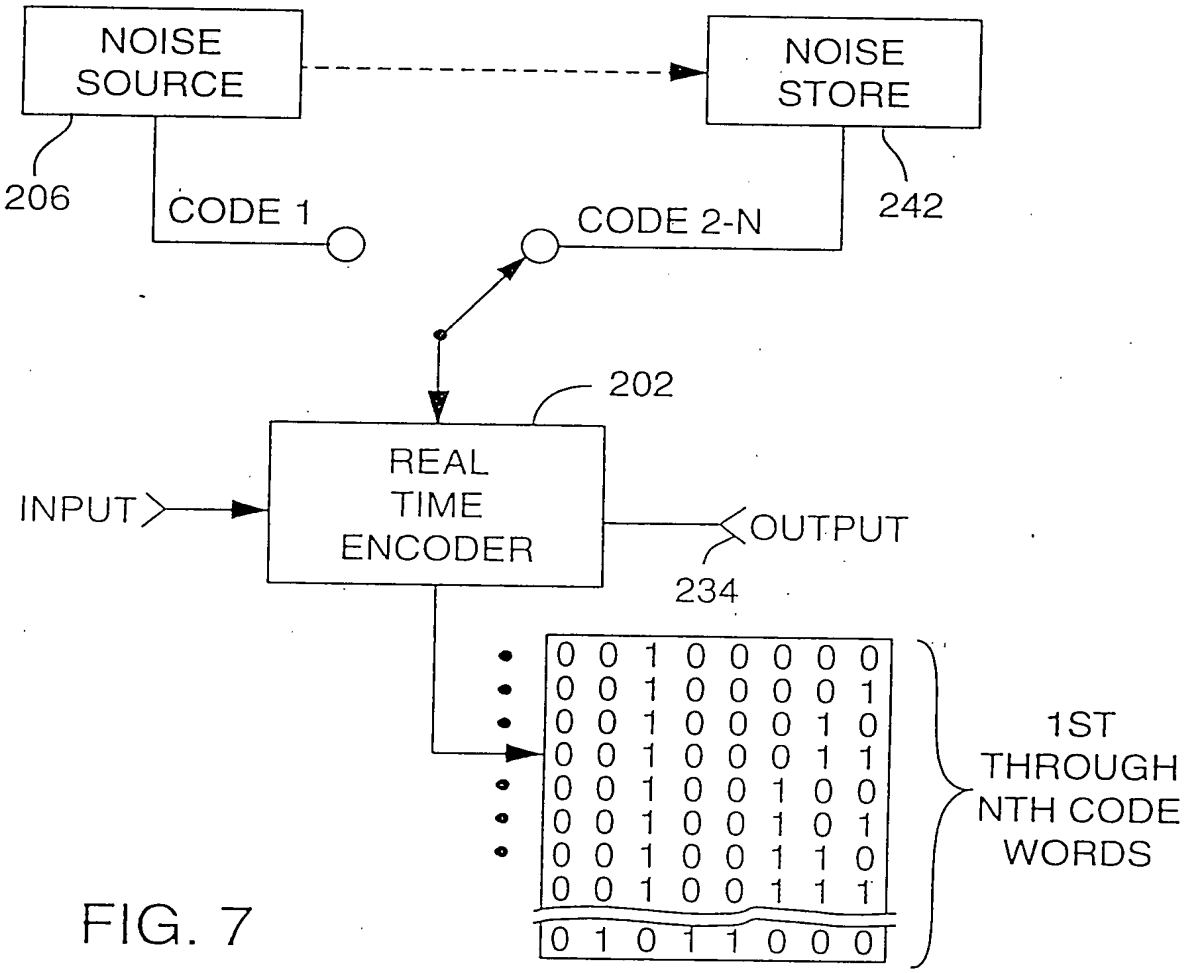
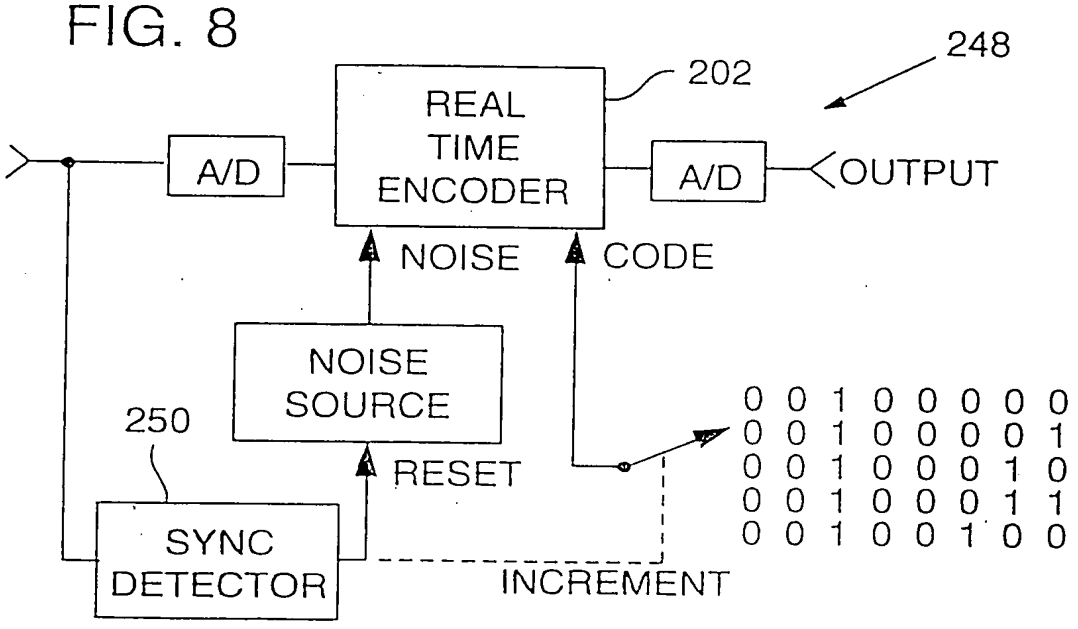


FIG. 7

FIG. 8



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 9A

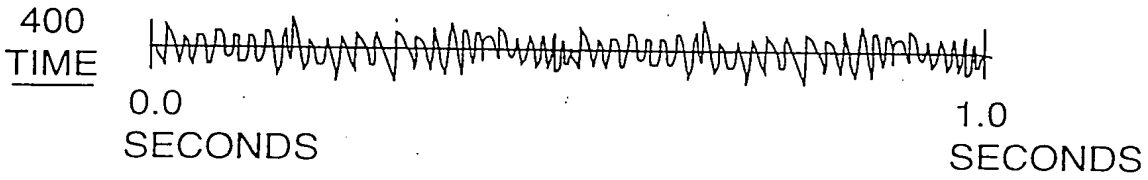


FIG. 9B

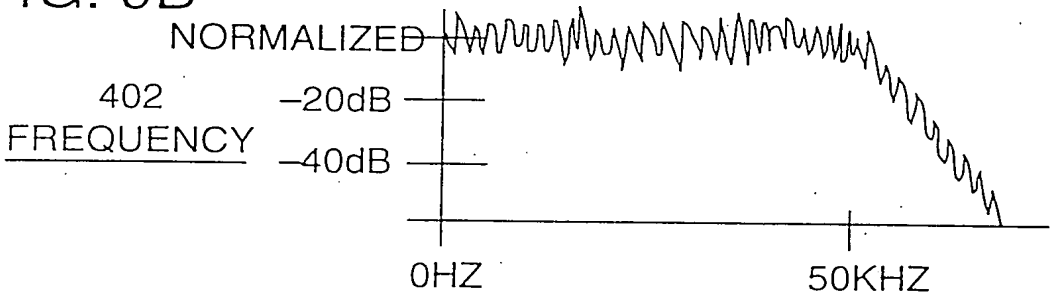


FIG. 9C

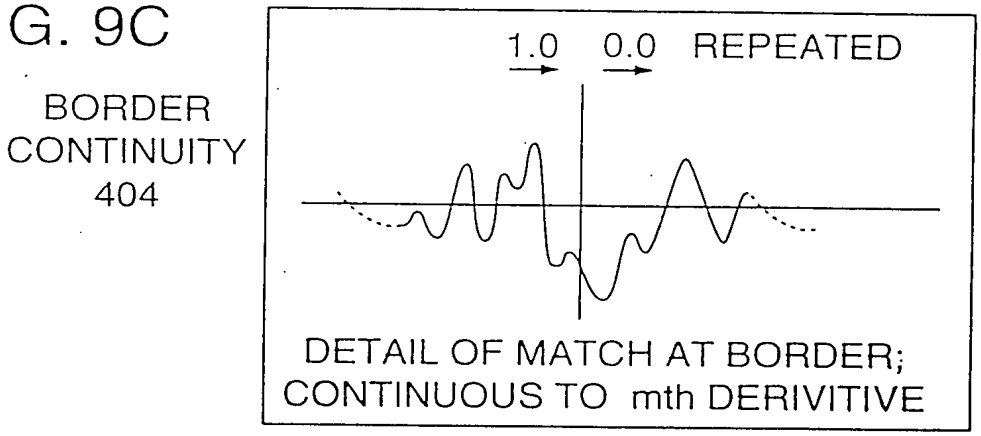
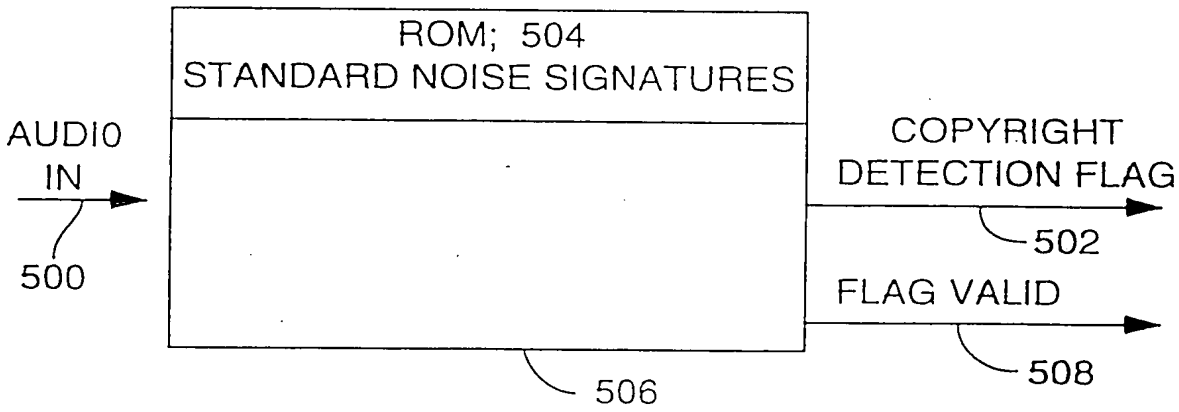


FIG. 10



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 11

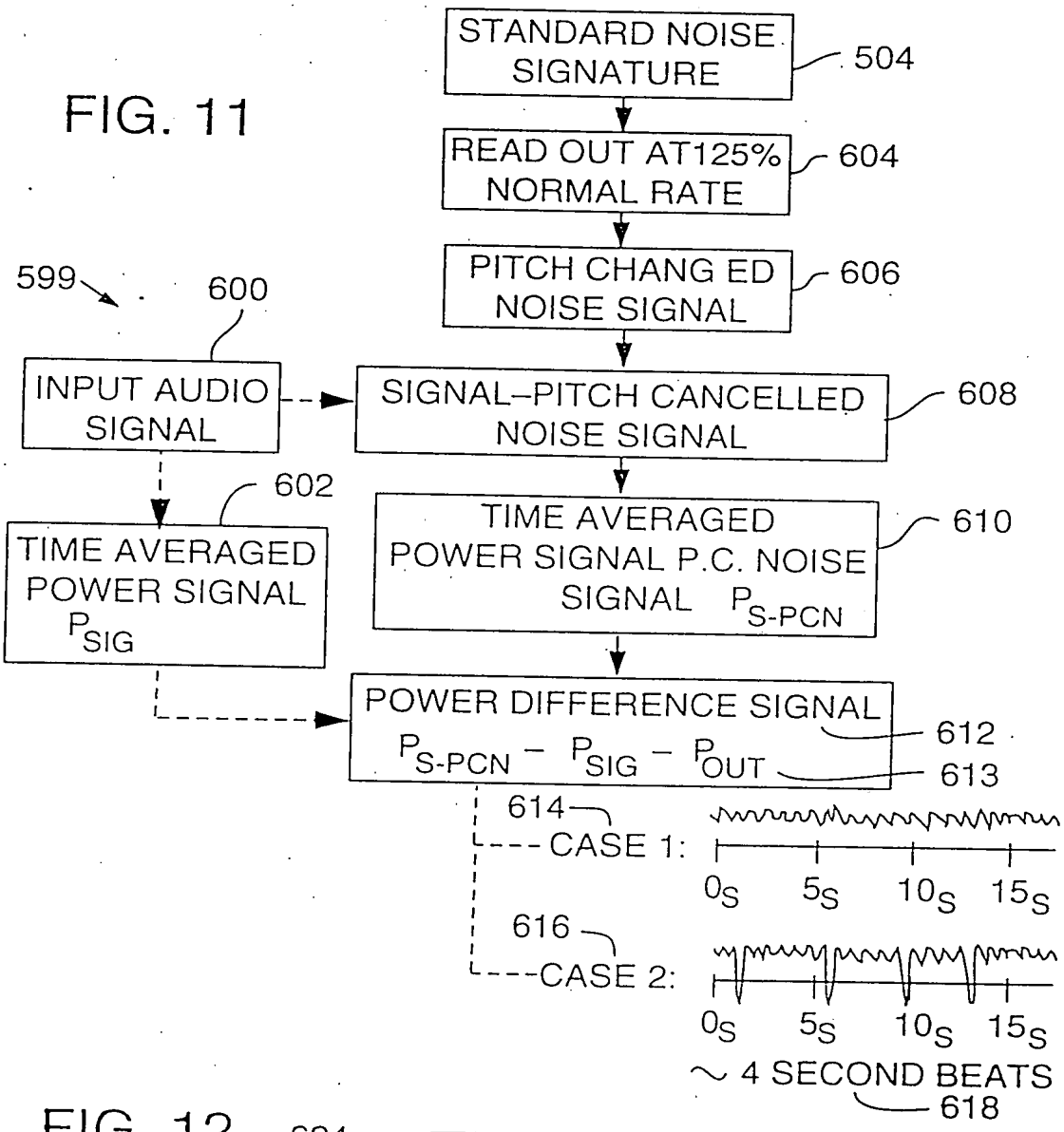
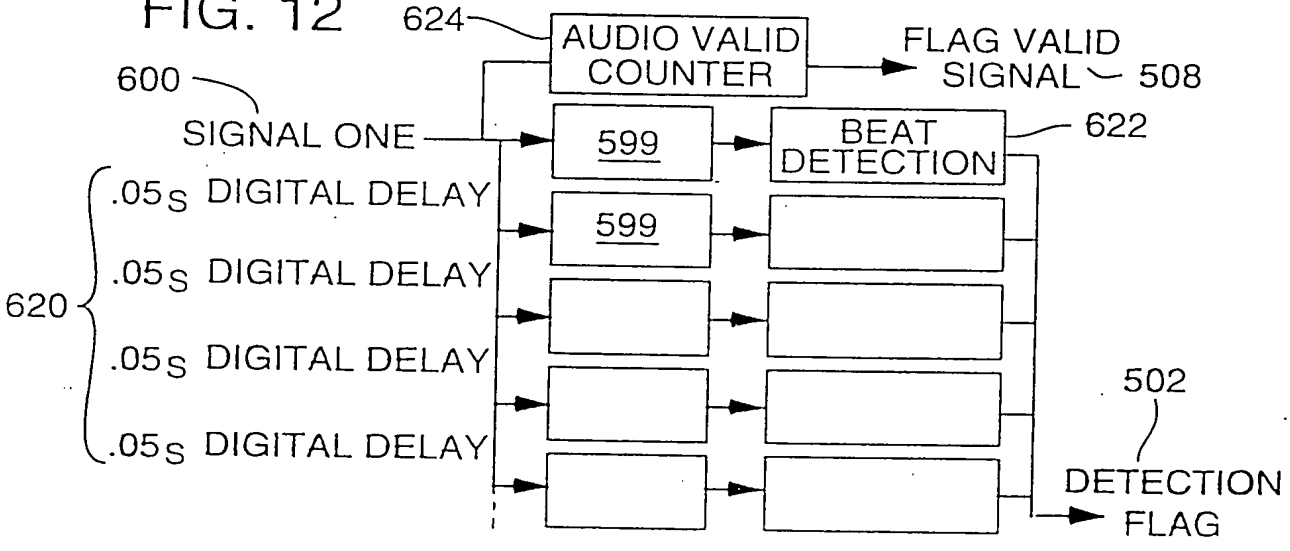
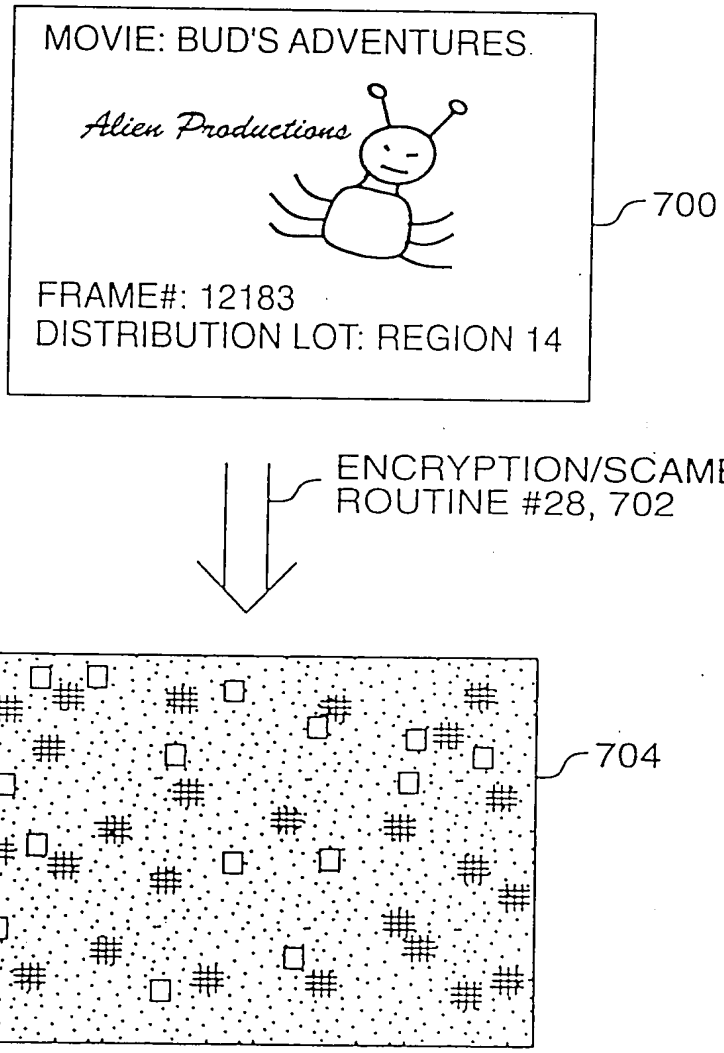


FIG. 12



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

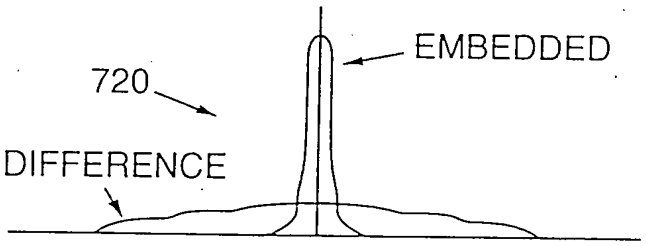
FIG. 13



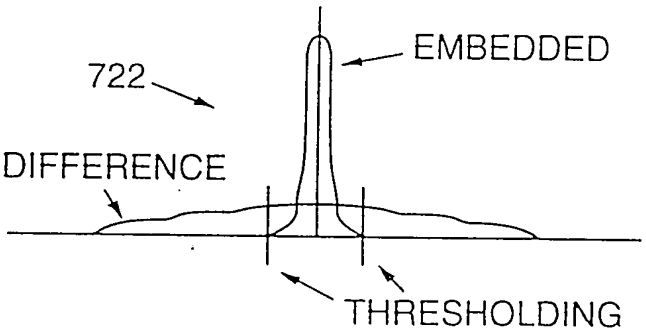
PSEUDO-RANDOM MASTER SNOWY IMAGE
(SCALED DOWN AND ADDED TO FRAME 12183)

APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 14



MEAN-REMOVED HISTOGRAMS OF DIFFERENCE SIGNAL AND KNOWN EMBEDDED CODE SIGNAL



MEAN-REMOVED HISTOGRAMS OF FIRST DERIVATIVES (OR SCALER GRADIENTS IN CASE OF AN IMAGE)

APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

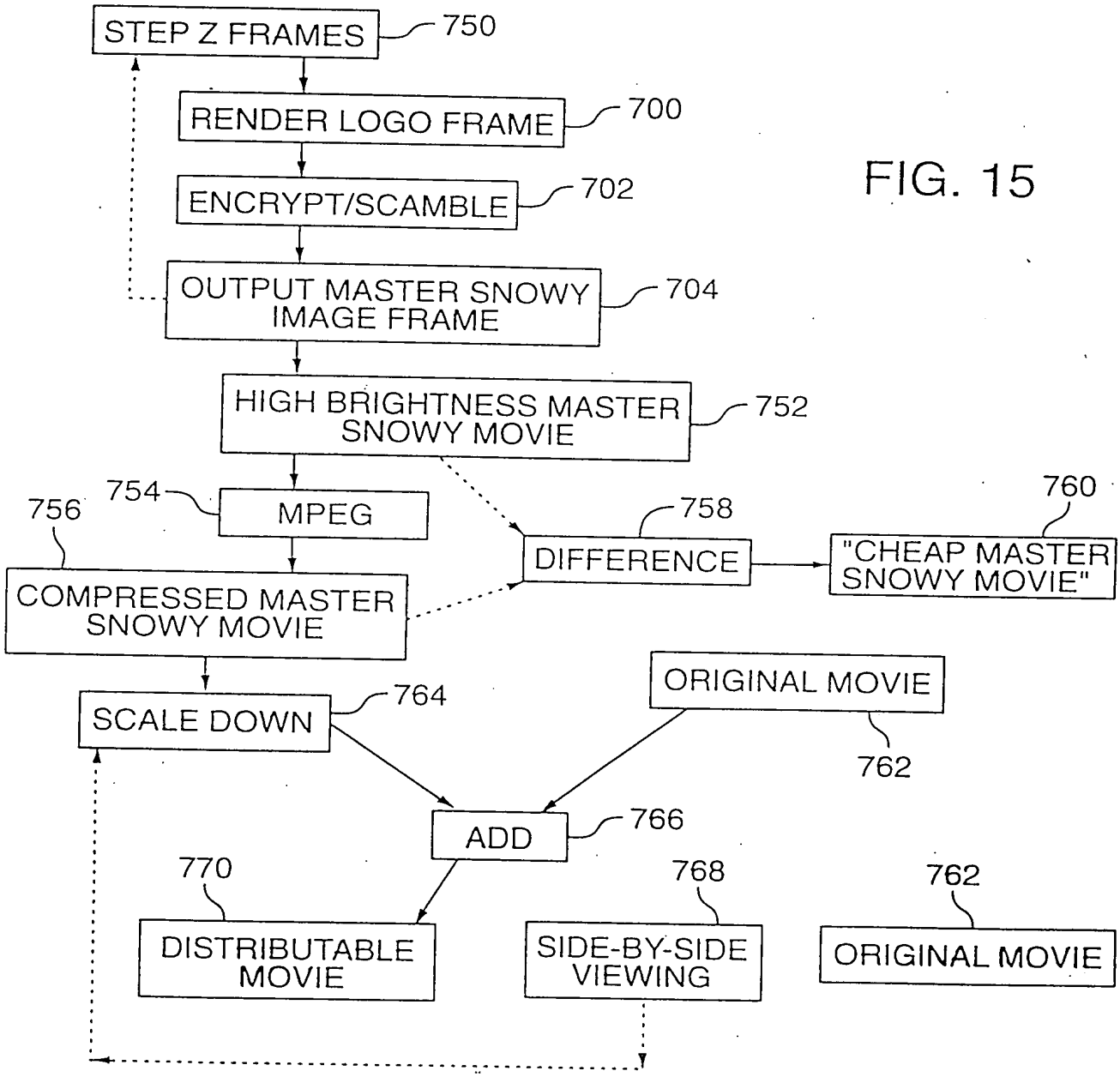
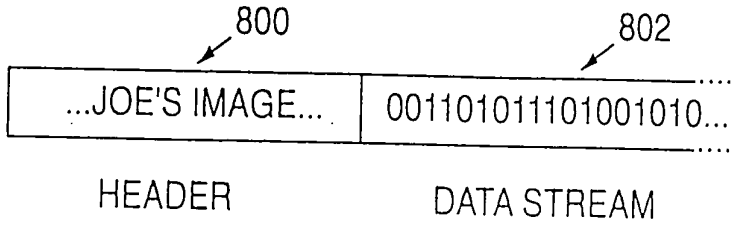
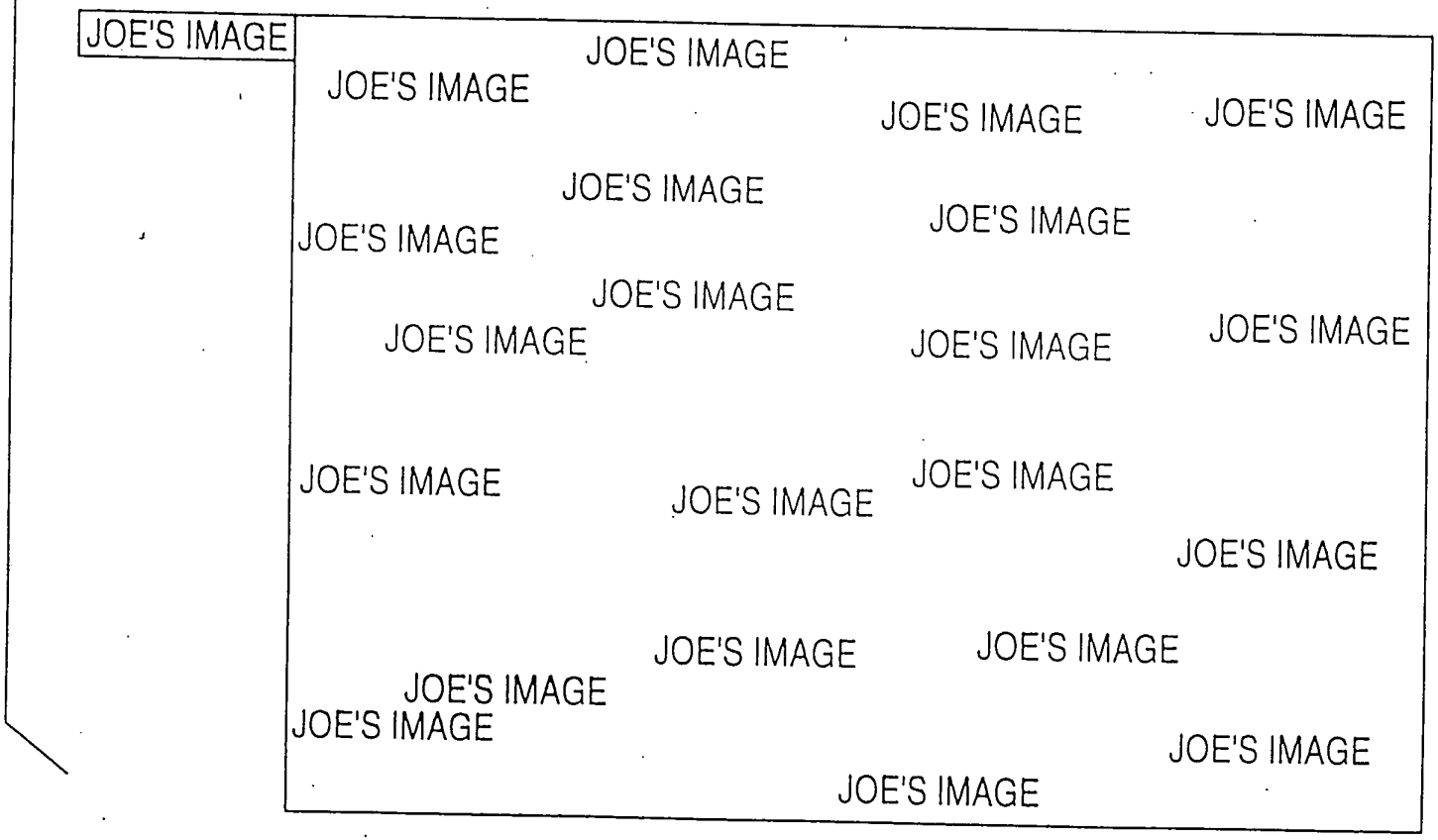


FIG. 15

FIG. 16

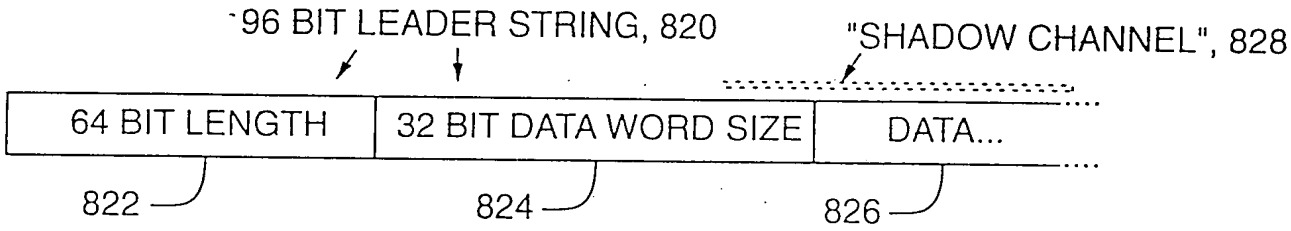




APPROVED
BY
DRAFTSMAN
O.G. FIG.
CLASS
SUBCLASS

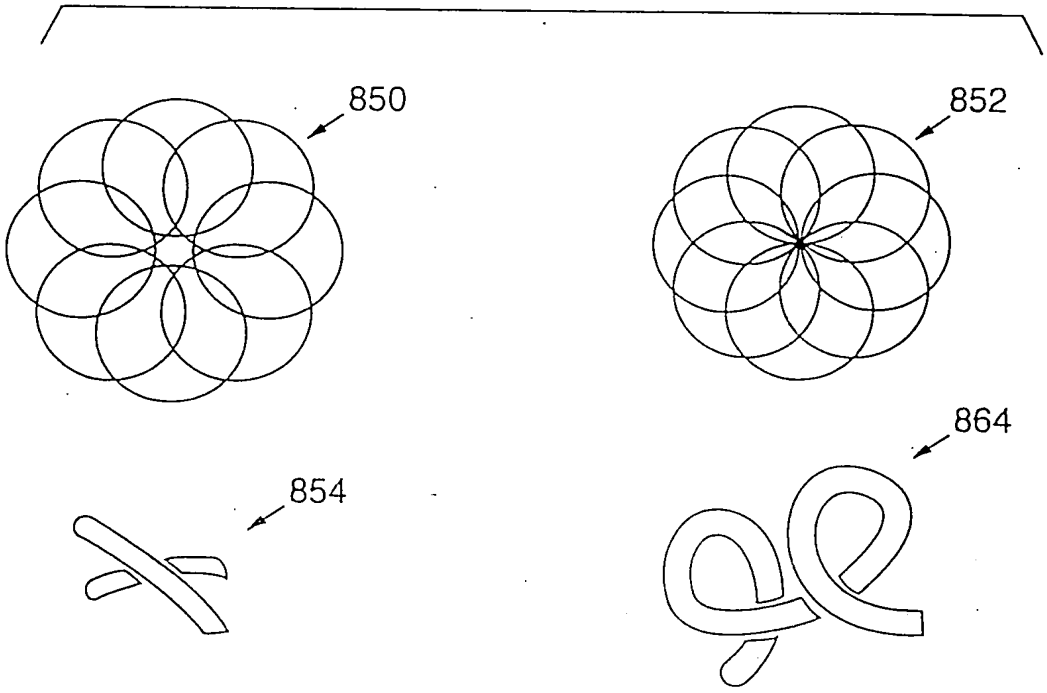
APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 17



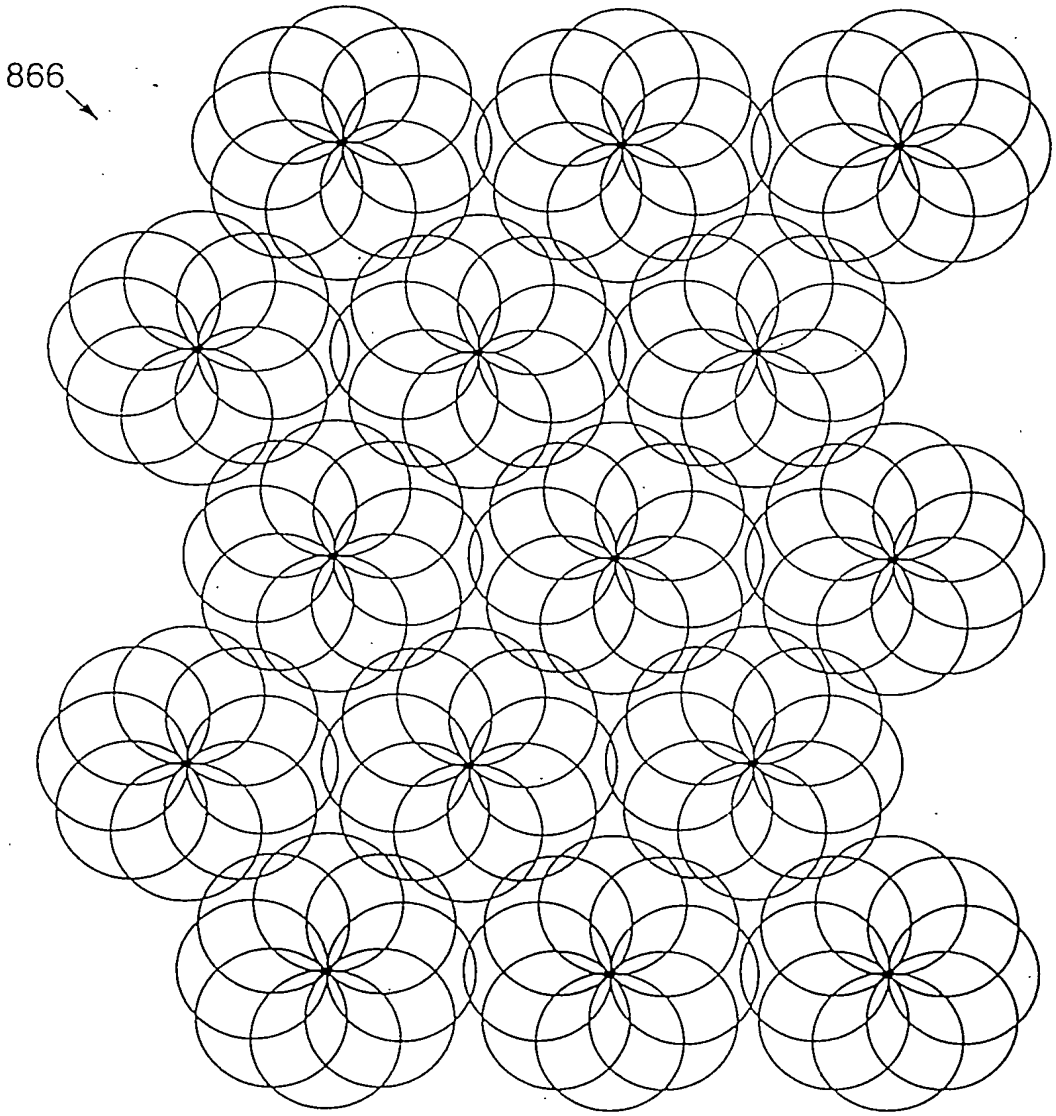
UNIVERSAL EMPIRICAL DATA FORMAT

FIG. 18



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

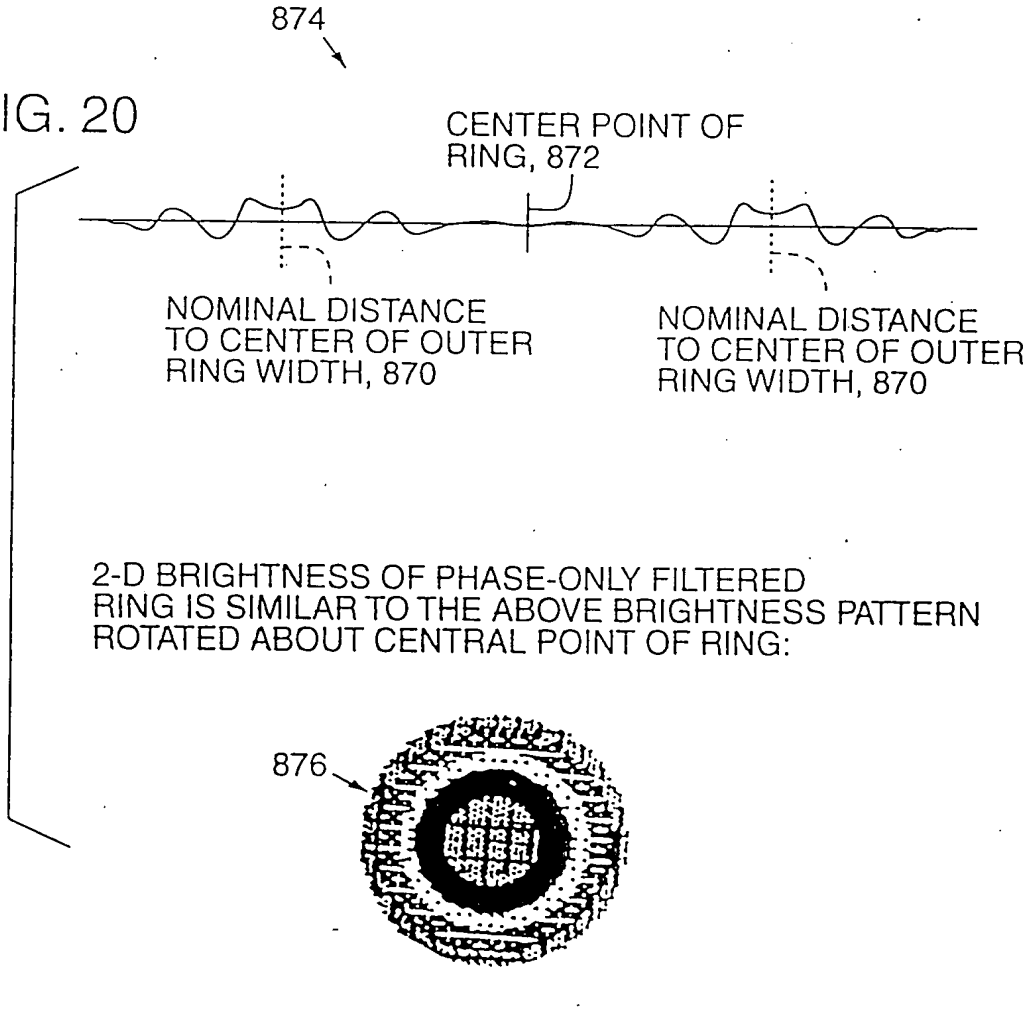
FIG. 19



QUEST FOR MOSAICED KNOT PATTERNS WHICH "COVER" AND ARE COEXTENSIVE WITH ORIGINAL IMAGE;
ALL ELEMENTAL KNOT PATTERNS CAN CONVEY THE SAME INFORMATION, SUCH AS A SIGNATURE, OR EACH CAN CONVEY A NEW MESSAGE IN A STEGANOGRAPHIC SENSE

APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 20



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 21A

900 →

C	2C	C
2C	4C	2C
C	2C	C

WHERE C = 1/16

ELEMENTARY BUMP
(DEFINED GROUPING OF PIXELS WITH WEIGHT VALUES)

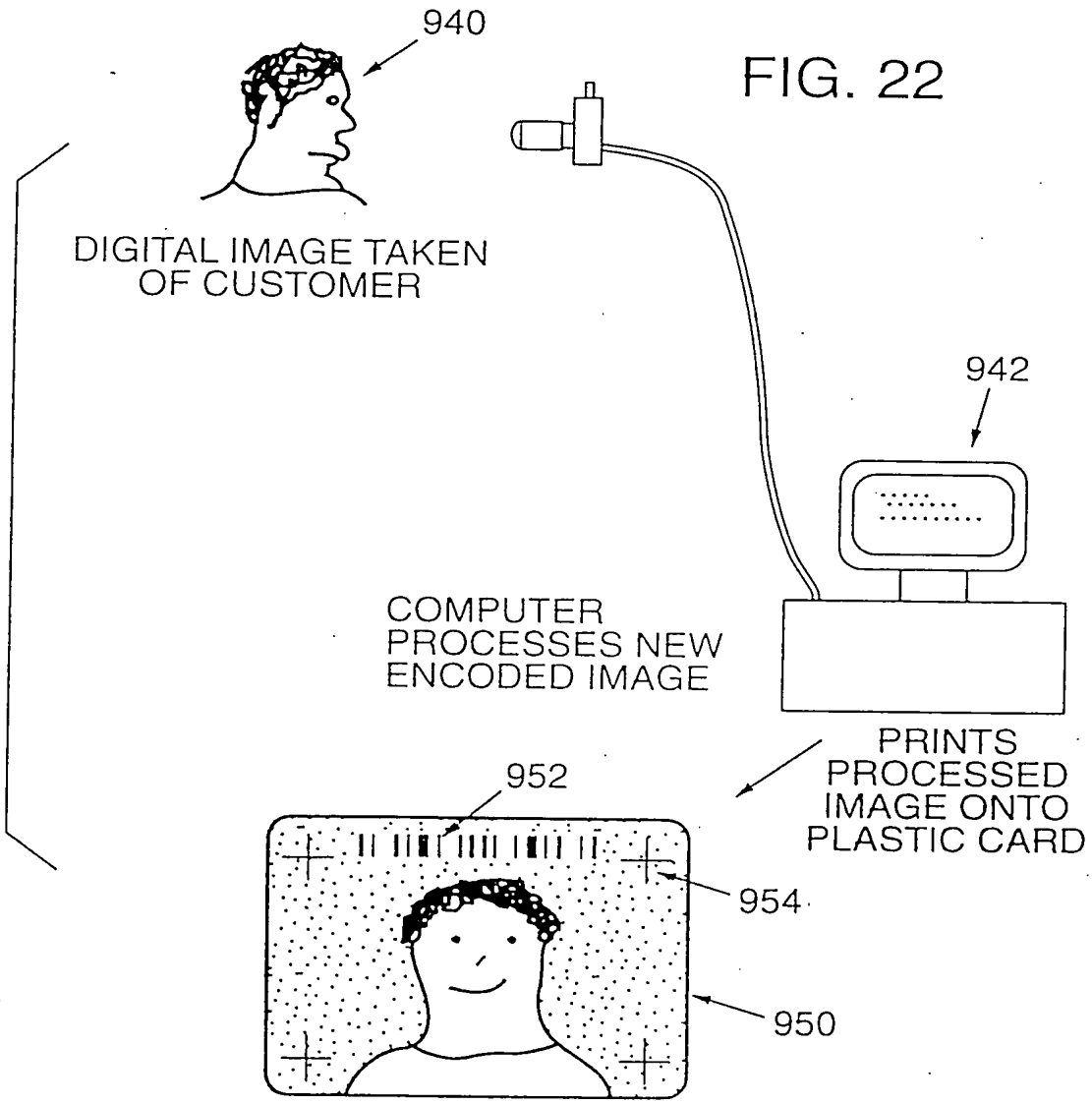
FIG. 21B

	2		3		4		5		6		7		0	
	6		7		0		1		2		3		4	
						C	2C	C						
	2		3		4	2C	4C	2C	6		7		0	
						C	2C	C						
	6		7		0		1		2		3		4	

EXAMPLE OF HOW MANY ELEMENTARY BUMPS, 900, WOULD BE ASSIGNED LOCATIONS IN AN IMAGE, AND THOSE LOCATIONS WOULD BE ASSOCIATED WITH A CORRESPONDING BIT PLANE IN THE N-BIT WORD, HERE TAKEN AS N=8 WITH INDEXES OF 0-7. ONE LOCATION, ASSOCIATED WITH BIT PLANE "5", HAS THE OVERLAY OF THE BUMP PROFILE DEPICTED.

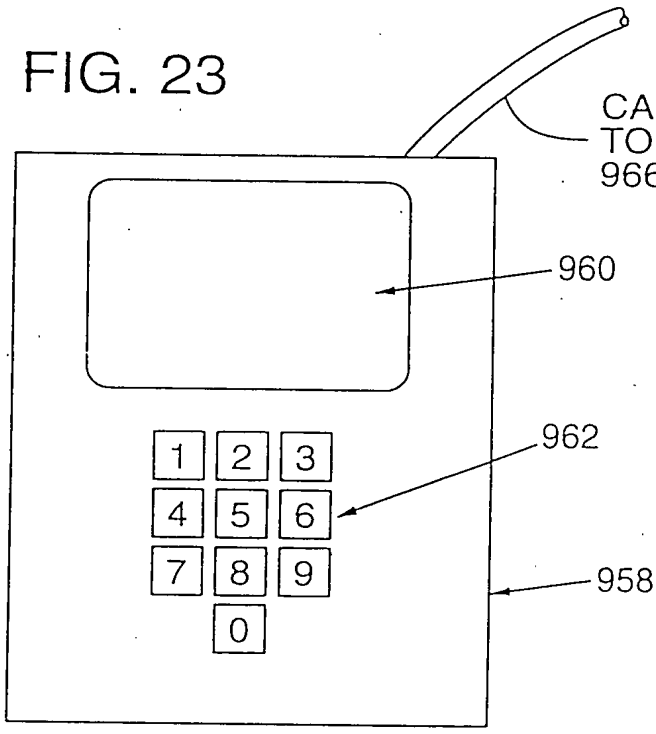
APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 22



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 23

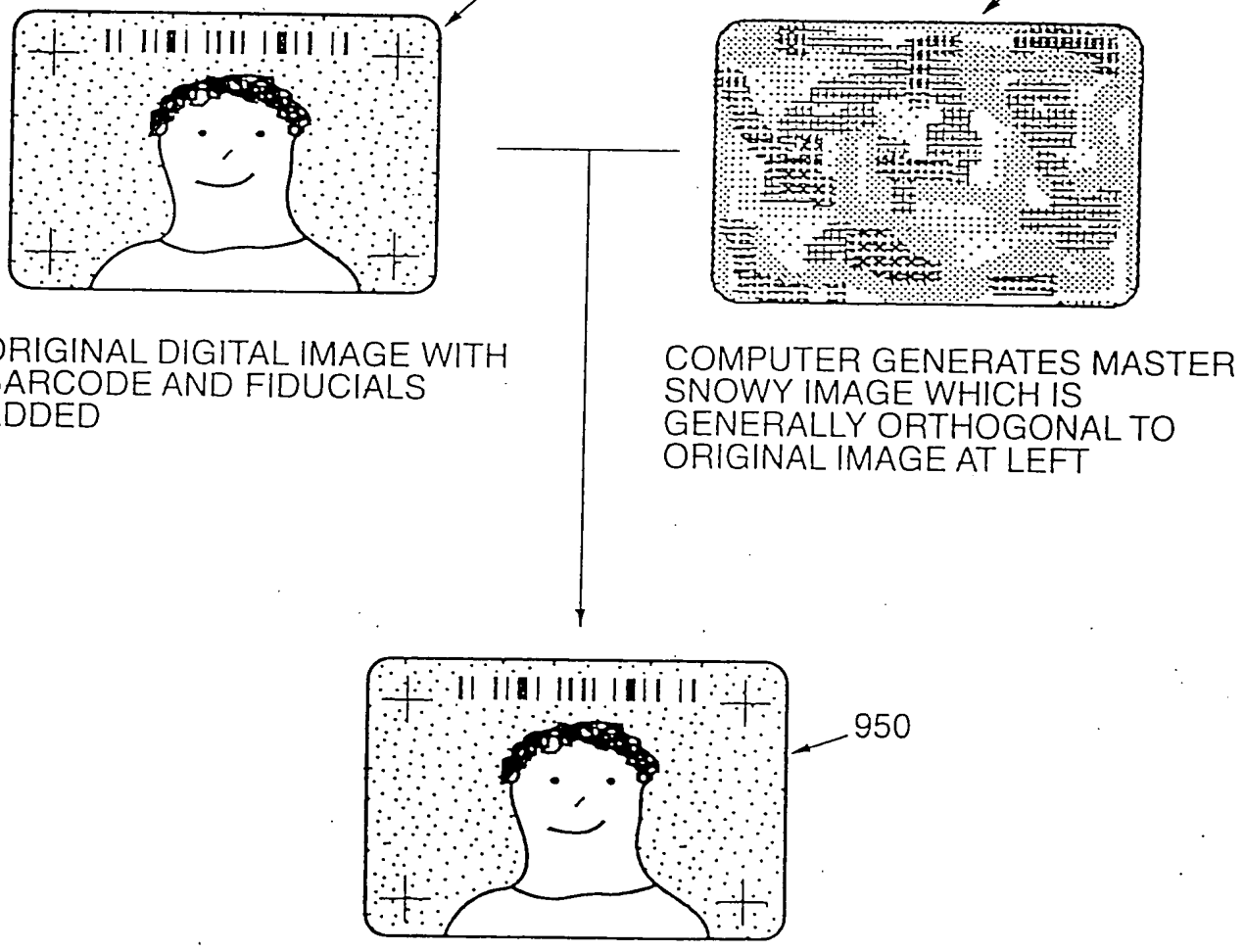


CONTAINS RUDIMENTARY OPTICAL SCANNER, MEMORY BUFFERS, COMMUNICATIONS DEVICES, AND MICROPROCESSOR

CONSUMER MERELY PLACES CARD INTO WINDOW AND CAN, AT THEIR PREARRANGED OPTION, EITHER TYPE IN A PERSONAL IDENTIFICATION NUMBER (PIN, FOR ADDED SECURITY) OR NOT. THE TRANSACTION IS APPROVED OR DISAPPROVED WITHIN SECONDS.

APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 24



APPROVED
DRAFTSMAN BY
O.G. FIG.
CLASS SUBCLASS

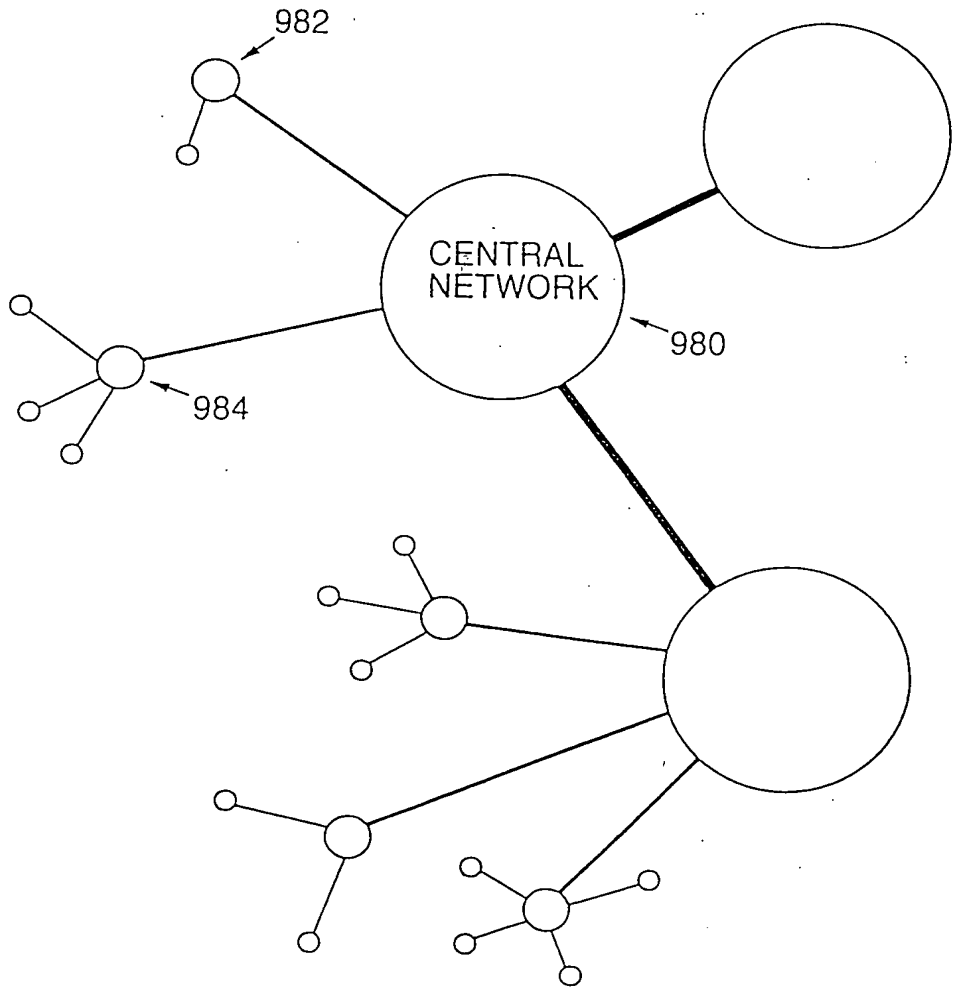
FIG. 25 TYPICAL TRANSACTION STEPS

1. READER SCANS IMAGE ON CARD, STORES IN MEMORY, EXTRACTS PERSON'S ID
2. OPTIONAL: USER KEYS IN PIN NUMBER
3. READER CALLS CENTRAL ACCOUNT DATA NETWORK, HANDSHAKES
4. READER SENDS ID, (PIN), MERCHANT INFORMATION, AND REQUESTED TRANSACTION AMOUNT TO CENTRAL NETWORK
5. CENTRAL NETWORK VERIFIES ID, PIN, MERCHANT INFO, AND ACCOUNT BALANCE
6. IF OK, CENTRAL NETWORK GENERATES TWENTY-FOUR SETS OF SIXTEEN DISTINCT RANDOM NUMBERS, WHERE THE RANDOM NUMBERS ARE INDEXES TO A SET OF 64K ORTHOGONAL SPATIAL PATTERNS
7. CENTRAL NETWORK TRANSMITS FIRST OK, AND THE SETS OF RANDOM NUMBERS
8. READER STEPS THROUGH THE TWENTY-FOUR SETS
   8A. READER ADDS TOGETHER SET OF ORTHOGONAL PATTERNS
   8B. READER PERFORMS DOT PRODUCT OF RESULTANT PATTERN AND CARD SCAN, STORES RESULT
9. READER TRANSMITS THE TWENTY-FOUR DOT PRODUCT RESULTS TO CENTRAL NETWORK
10. CENTRAL NETWORK CHECKS RESULTS AGAINST MASTER
11. CENTRAL NETWORK SENDS FINAL APPROVAL OR DENIAL
12. CENTRAL NETWORK DEBITS MERCHANT ACCOUNT, CREDITS CARD ACCOUNT

APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 26

THE NEGLIGIBLE-FRAUD CASH CARD SYSTEM



A BASIC FOUNDATION OF THE CASH CARD SYSTEM IS A 24-HOUR INFORMATION NETWORK, WHERE BOTH THE STATIONS WHICH CREATE THE PHYSICAL CASH CARDS, 950, AND THE POINT-OF-SALES, 984, ARE ALL HOOKED UP TO THE SAME NETWORK CONTINUOUSLY

APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

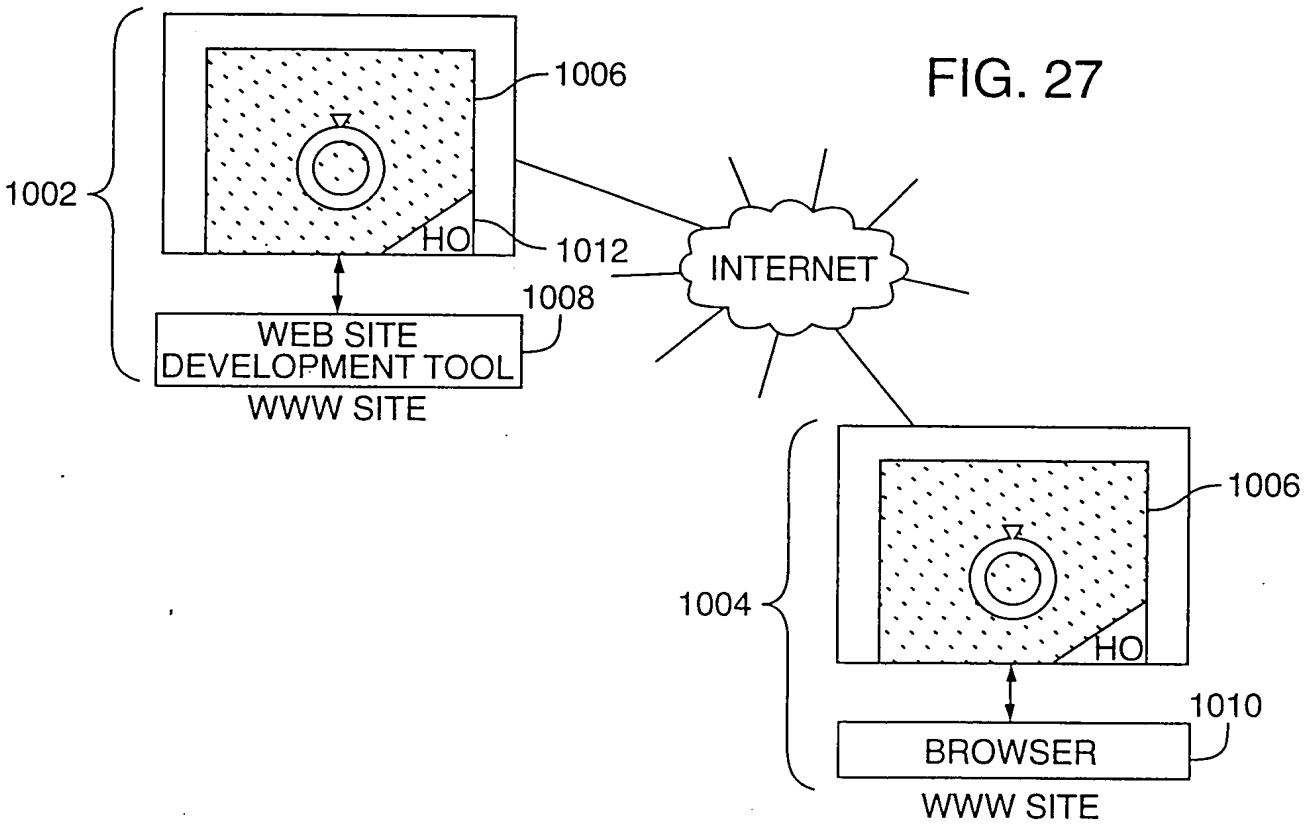
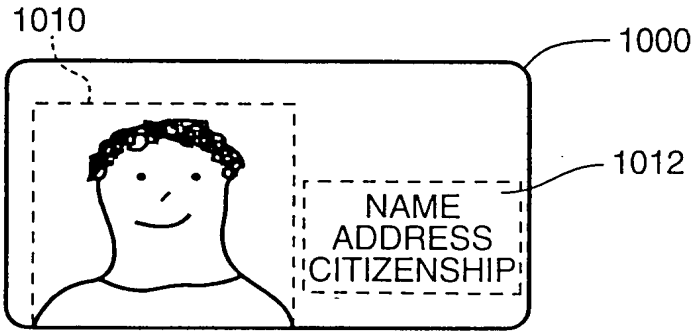


FIG. 27

FIG. 28



APPROVED BY DRAFTSMAN
O.G. FIG.
CLASS
SUBCLASS

FIG. 27A

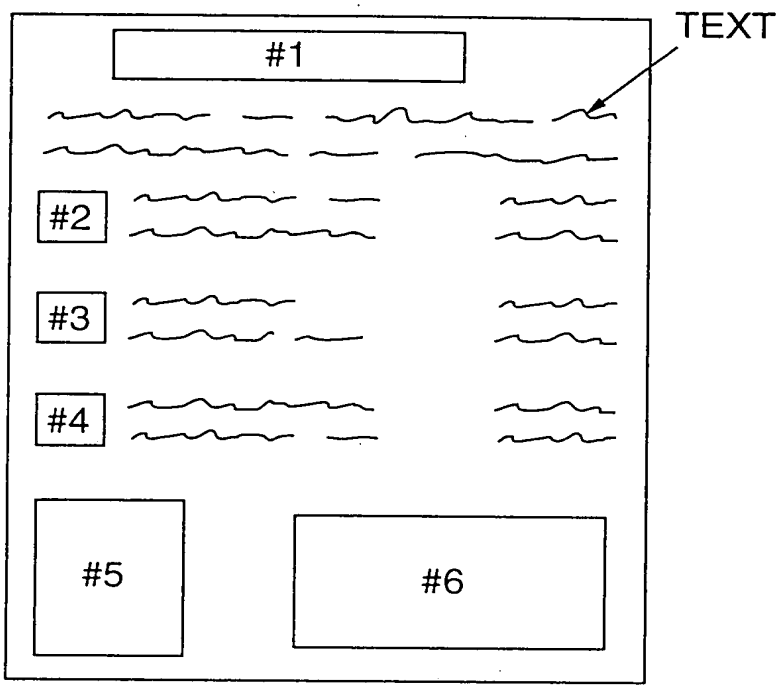
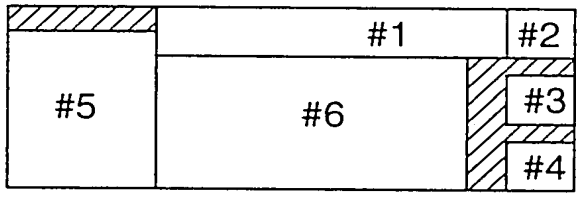
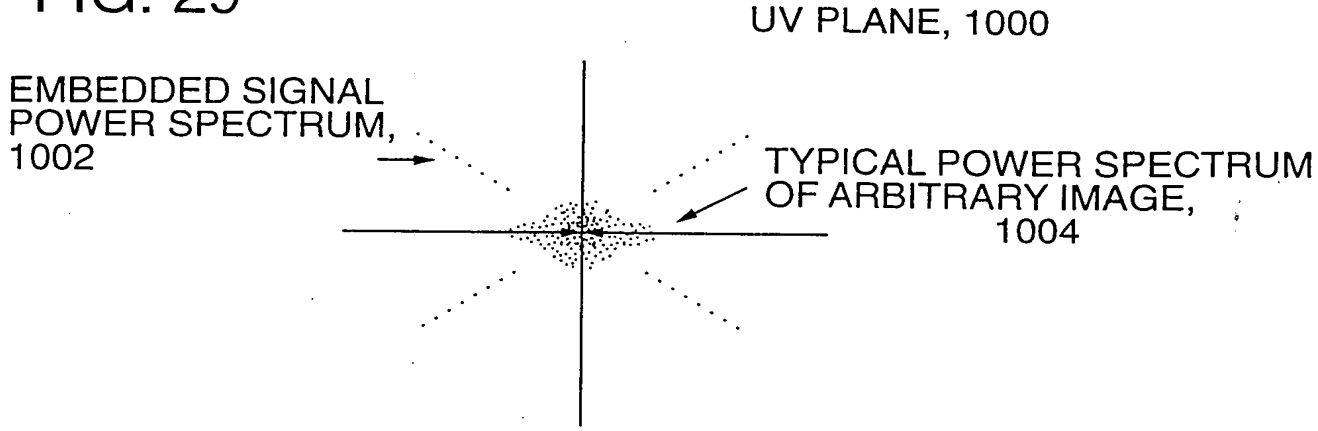


FIG. 27B



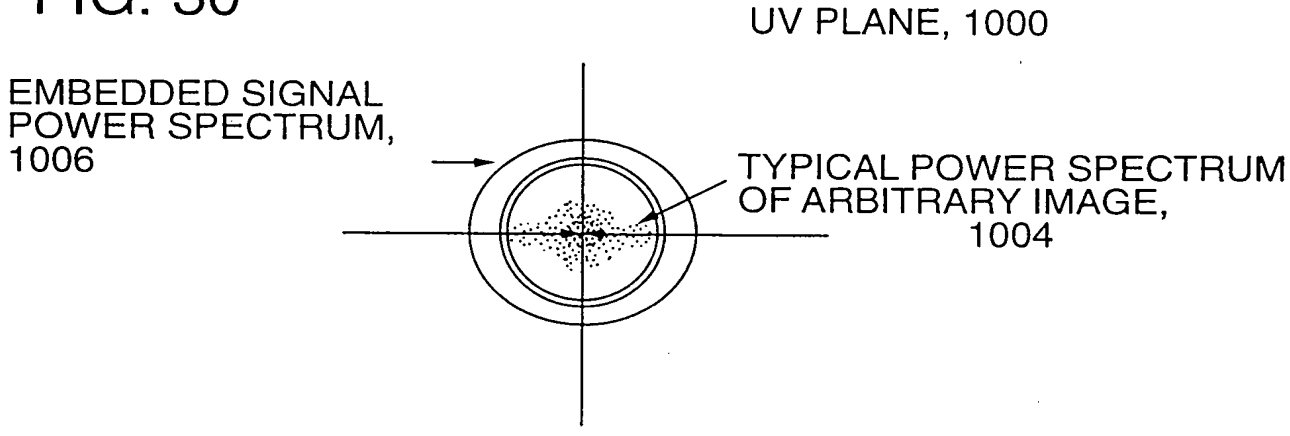
APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 29



NON-HARMONIC SPATIAL FREQUENCIES ALONG THE 45 DEGREE AXES, GIVING RISE TO A WEAVE-LIKE CROSS-HATCHING PATTERN IN THE SPATIAL DOMAIN

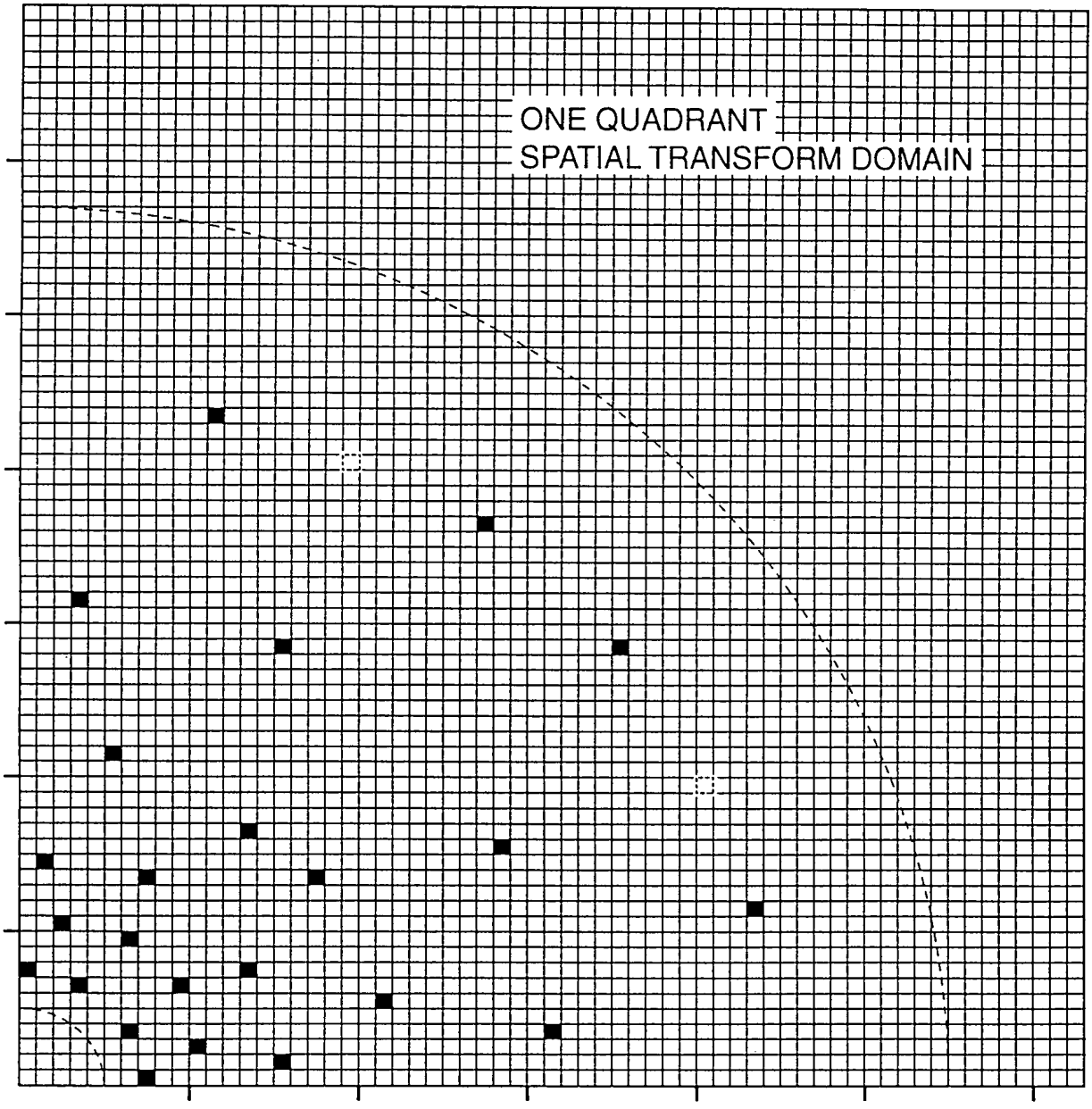
FIG. 30



NON-HARMONIC CONCENTRIC CIRCLES IN UV PLANE, WHERE PHASE HOPS QUASI-RANDOMLY ALONG EACH CIRCLE, GIVING RISE TO PSEUDO RANDOM LOOKING PATTERNS IN THE SPATIAL DOMAIN

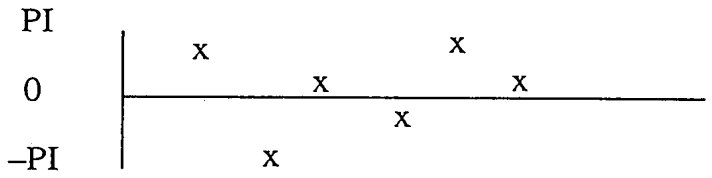
APPROVED
BY
DRAFTSMAN
O.G. FIG.
CLASS
SUBCLASS

FIG. 29A



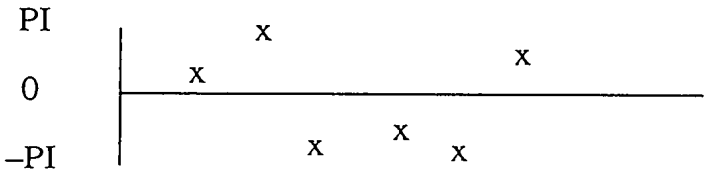
APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 31A



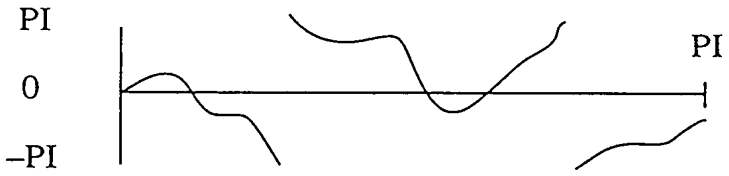
PHASE OF SPATIAL FREQUENCIES ALONG FORWARD 45 DEGREE AXES, 1008

FIG. 31B



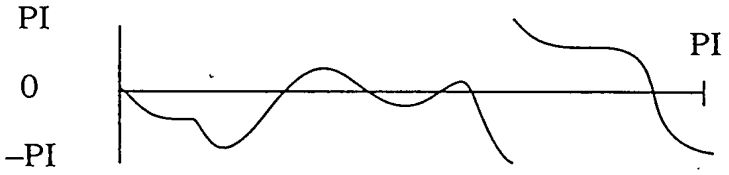
PHASE OF SPATIAL FREQUENCIES ALONG BACKWARD 45 DEGREE AXES, 1010

FIG. 32A



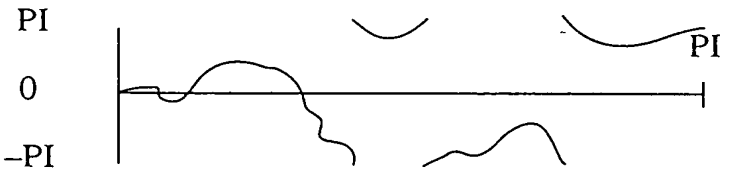
PHASE OF SPATIAL FREQUENCIES ALONG FIRST CONCENTRIC RING, 1012

FIG. 32B



PHASE OF SPATIAL FREQUENCIES ALONG SECOND CONCENTRIC RING, 1014

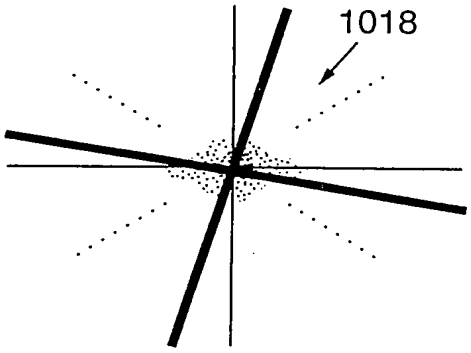
FIG. 32C



PHASE OF SPATIAL FREQUENCIES ALONG THIRD CONCENTRIC RING, 1016

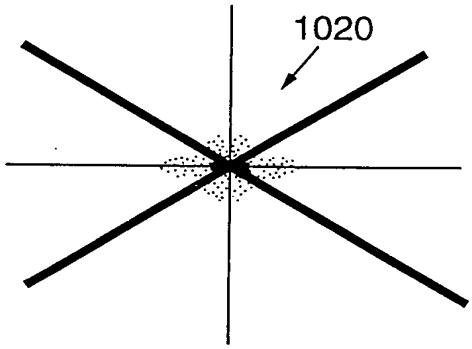
APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 33A



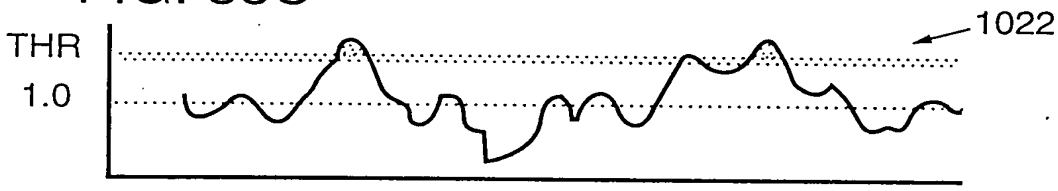
ANGLE A

FIG. 33B



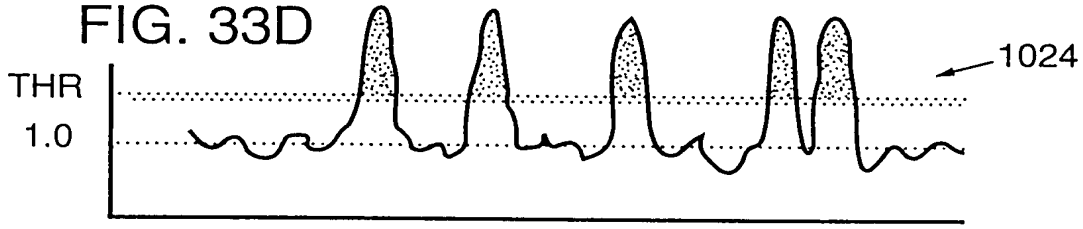
ANGLE B

FIG. 33C



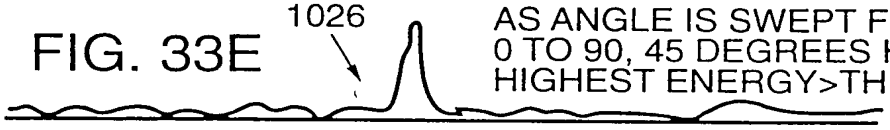
POWER PROFILE ALONG ANGLE A, AS NORMALIZED BY ITS OWN MOVING AVERAGE; ONLY A MINIMAL AMOUNT EXCEEDS THRESHOLD, GIVING A SMALL INTEGRATED VALUE

FIG. 33D



POWER PROFILE ALONG ANGLE B, AS NORMALIZED BY ITS OWN MOVING AVERAGE; THIS FINDS STRONG ENERGY ABOVE THE THRESHOLD

FIG. 33E



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 34A

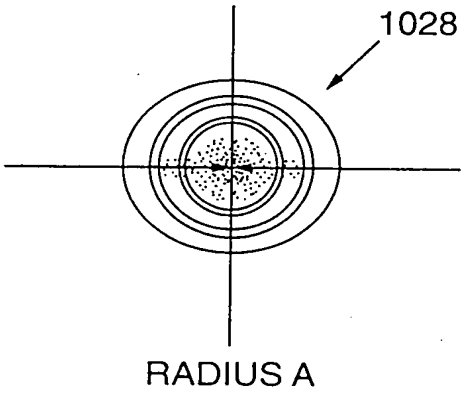


FIG. 34B

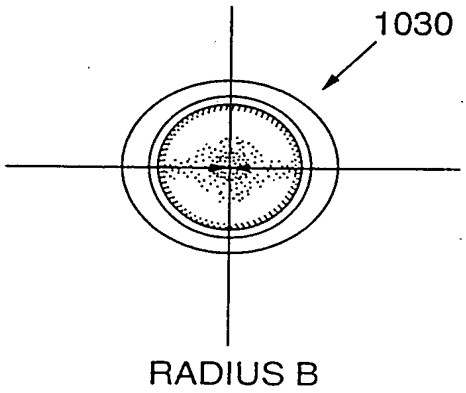


FIG. 34C

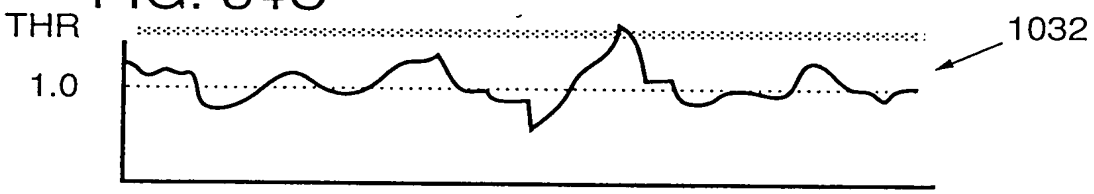


FIG. 34D

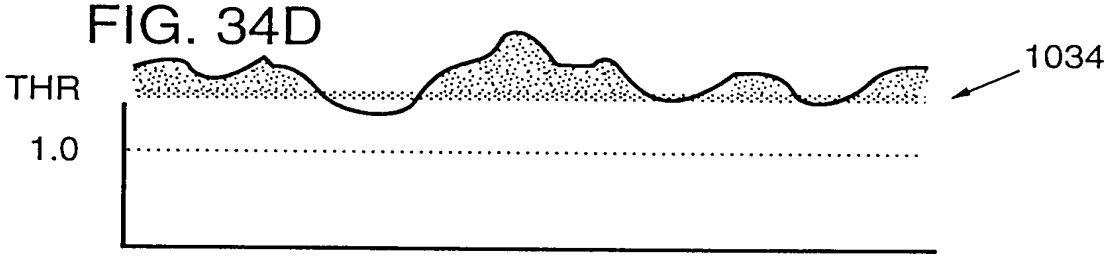
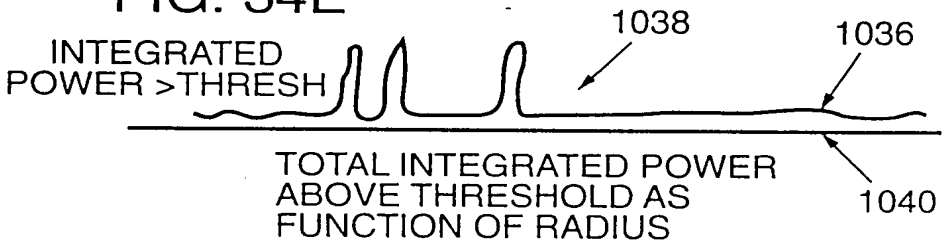
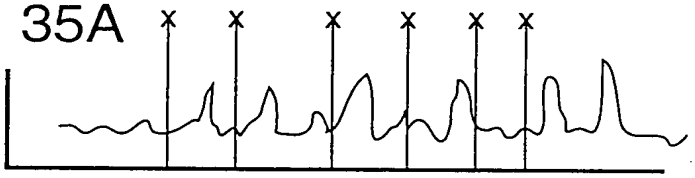


FIG. 34E



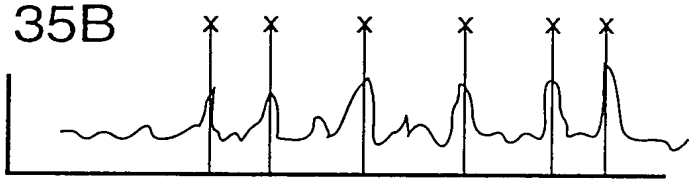
APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 35A



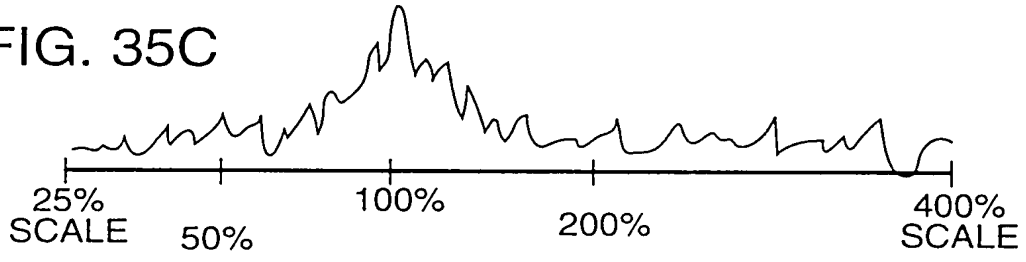
SCALE = A; ADD ALL POWER VALUES AT THE "KNOWN" FREQUENCIES", 1042

FIG. 35B



SCALE = B; ADD ALL POWER VALUES AT THE "KNOWN" FREQUENCIES", 1044

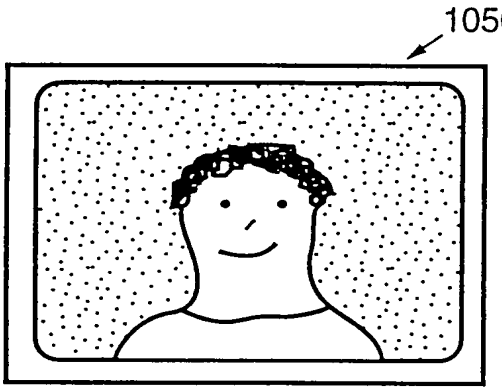
FIG. 35C



"SCALED-KERNEL" BASED MATCHED FILTER; PEAK IS WHERE THE SCALE OF THE SUBLIMINAL GRID WAS FOUND, 1046

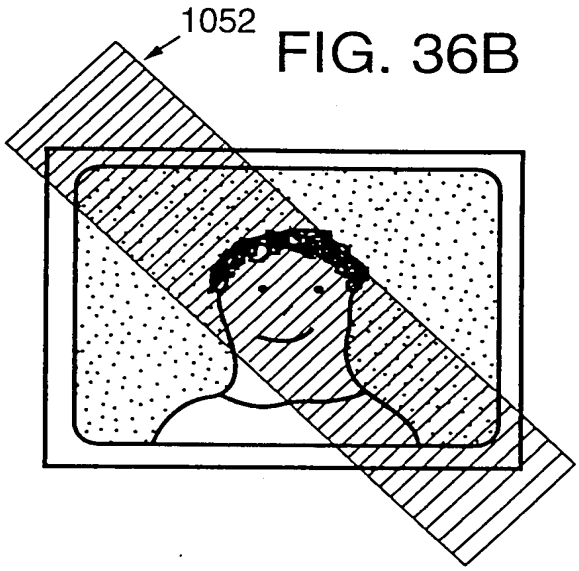
APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 36A



ARBITRARY ORIGINAL IMAGE IN WHICH SUBLIMINAL GRATICULES MAY HAVE BEEN PLACED

FIG. 36B



"COLUMN SCAN" IS APPLIED ALONG A GIVEN ANGLE THROUGH THE CENTER OF THE IMAGE

FIG. 36C

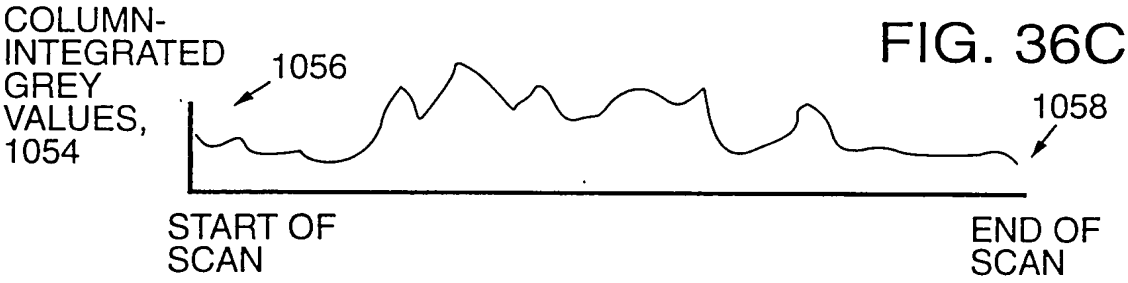
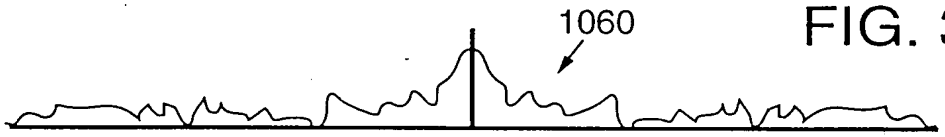


FIG. 36D



MAGNITUDE OF FOURIER TRANSFORM OF SCAN DATA

APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

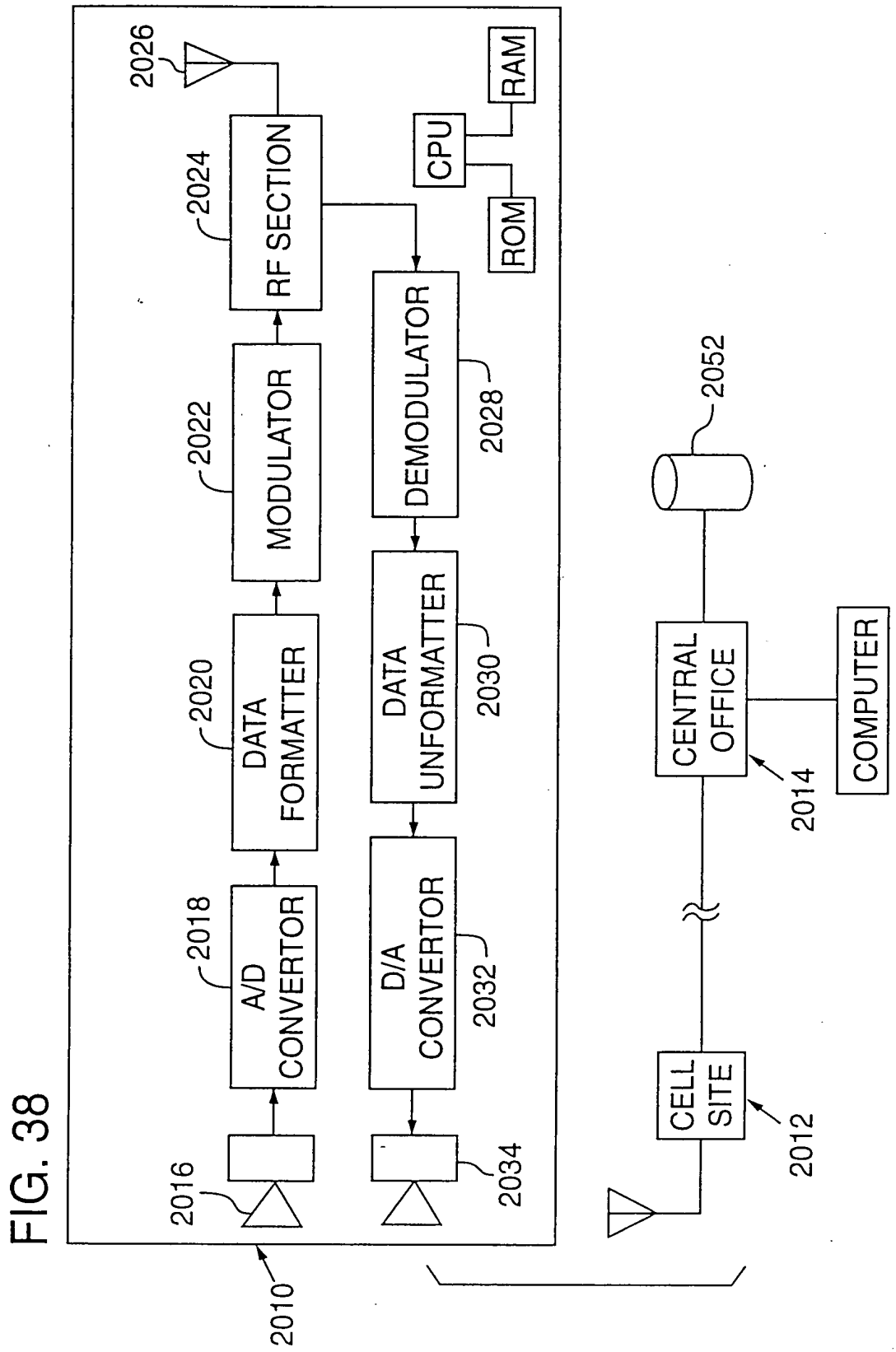
FIG. 37

PROCESS STEPS

1. SCAN IN PHOTOGRAPH
2. 2D FFT
3. GENERATE 2D POWER SPECTRUM, FILTER WITH E.G. 3X3 BLURRING KERNEL
4. STEP ANGLES FROM 0 DEGREES THROUGH 90 (1/2 DEG)
5. GENERATE NORMALIZED VECTOR, WITH POWER VALUE AS NUMERATOR, AND MOVING AVERAGED POWER VALUE AS DENOMINATOR
6. INTEGRATE VALUES AS SOME THRESHOLD, GIVING A SINGLE INTEGRATED VALUE FOR THIS ANGLE
7. END STEP ON ANGLES
8. FIND TOP ONE OR TWO OR THREE "PEAKS" FROM THE ANGLES IN LOOP 4, THEN FOR EACH PEAK...
9. STEP SCALE FROM 25% TO 400%, STEP ~1.01
10. ADD THE NORMALIZED POWER VALUES CORRESPONDING TO THE 'N' SCALED FREQUENCIES OF STANDARD
11. KEEP TRACK OF HIGHEST VALUE IN LOOP
12. END LOOP 9 AND 8, DETERMINE HIGHEST VALUE
13. ROTATION AND SCALE NOW FOUND
14. PERFORM TRADITIONAL MATCHED FILTER TO FIND EXACT SPATIAL OFFSET
15. PERFORM ANY "FINE TUNING" TO PRECISELY DETERMINE ROTATION, SCALE, OFFSET

APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

FIG. 38



APPROVED BY DRAFTSMAN
O.G. FIG.
CLASS
SUBCLASS

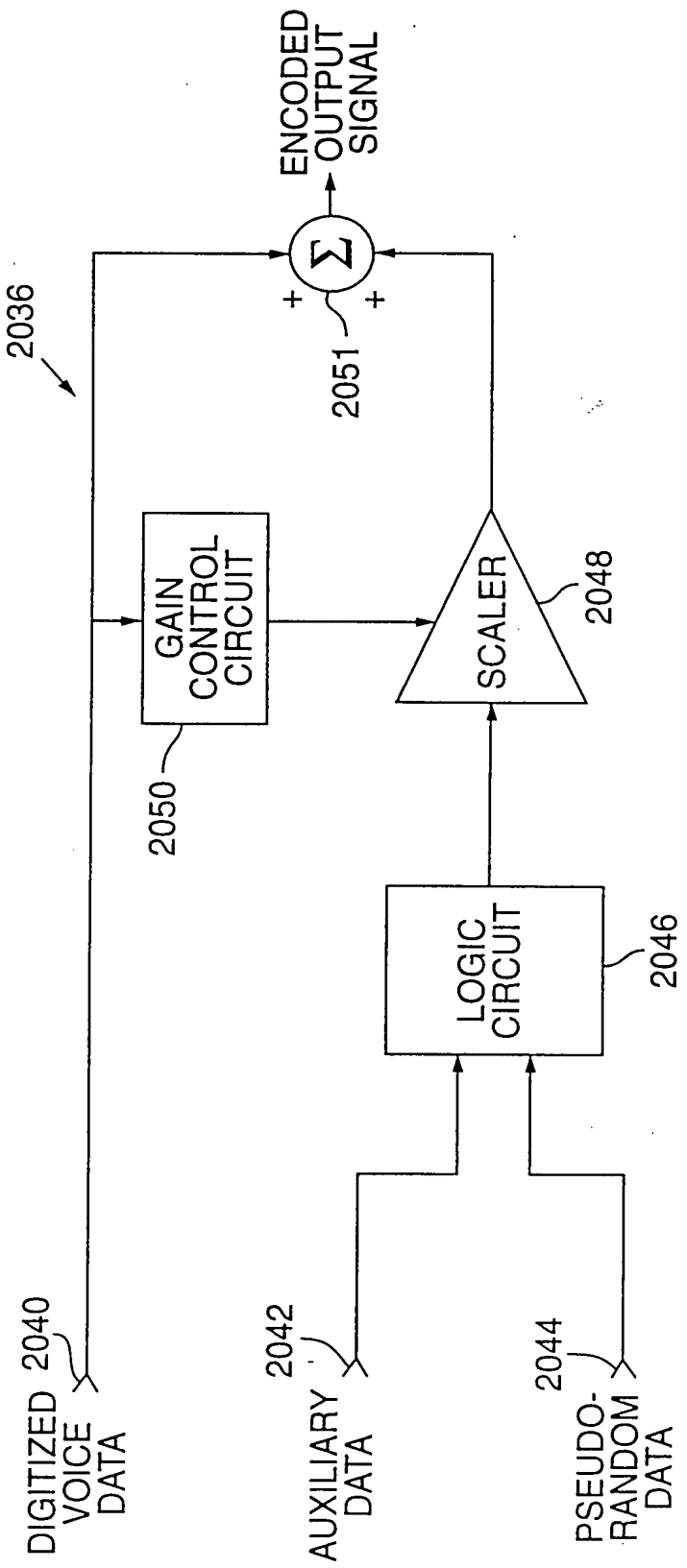


FIG. 39

APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

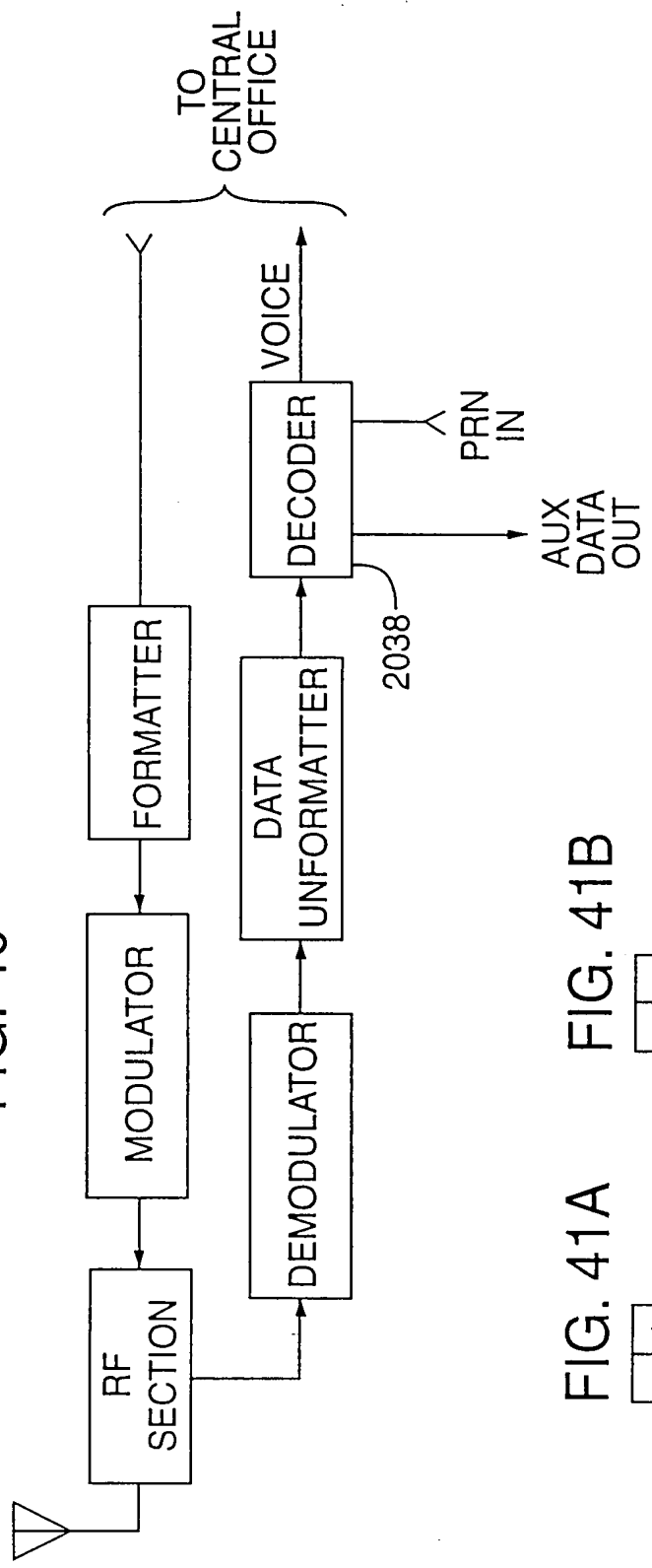


FIG. 40

FIG. 41A

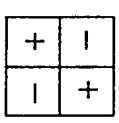
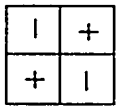


FIG. 41B



APPROVED BY DRAFTSMAN | O.G. FIG. | CLASS | SUBCLASS

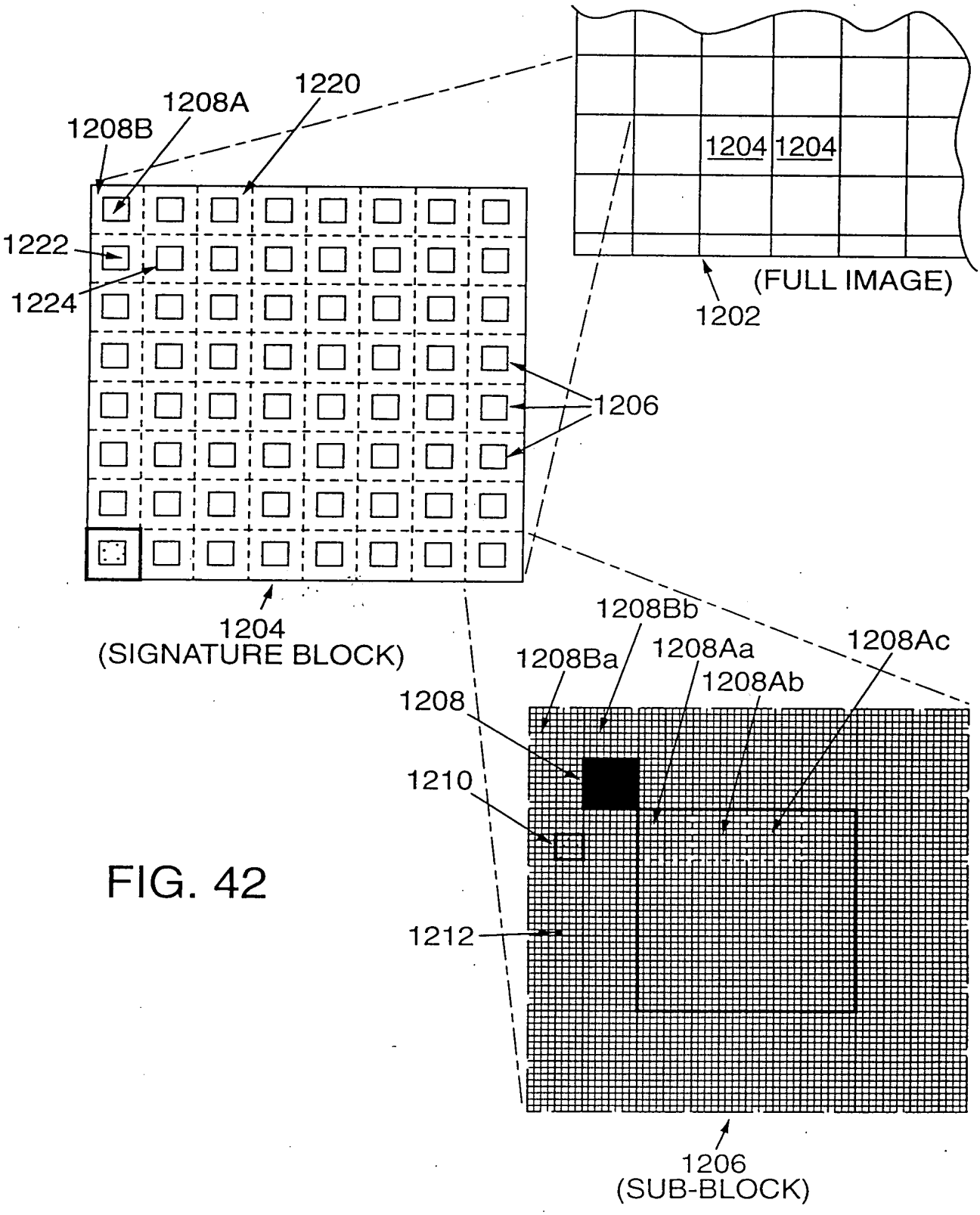


FIG. 42